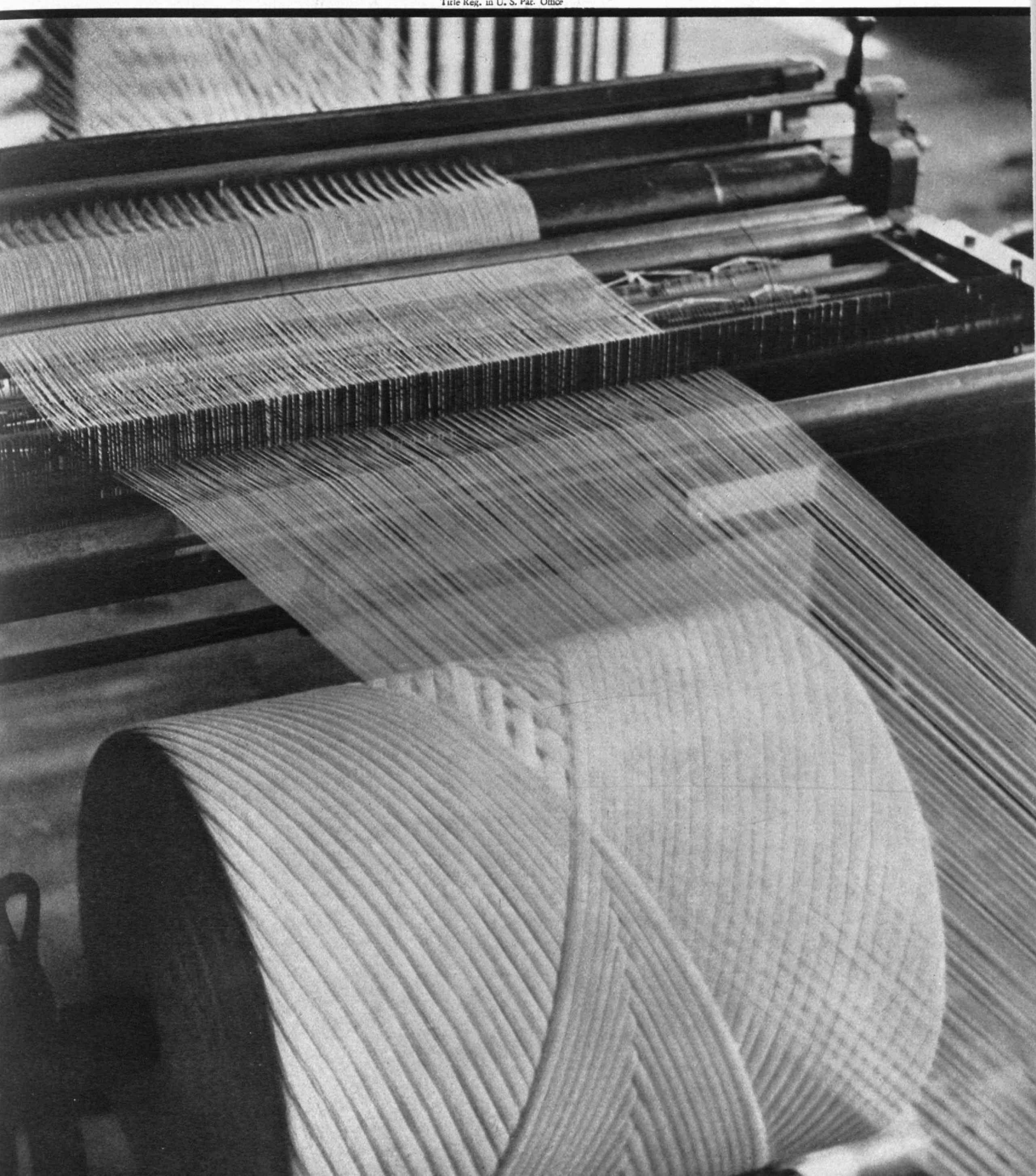
November 1933

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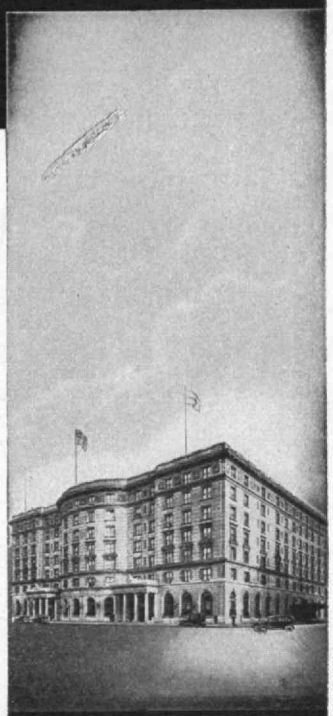
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THE TABULAR VIEW

EMINENT as a mathematician, stimulating as a writer, Dr. NORBERT WIENER is welcomed again to the pages of The Review. Articles contributed by him in the past include "Mathematics and Art" (Jan. 1930); "Murder and Mathematics" (Mar. 1929); and "Einsteiniana" (May 1929). It is worthwhile pointing out that Lord Rutherford's recent denial — a denial caged in the argot of *opéra bouffe* — of the availability of atomic energy is not concurred in by all scientists. ¶ Once an instructor in Naval Architecture, F. A. MAGOUN, '18, is now Associate Professor of Humanics at Technology. He is the author of such diverse titles as "The Frigate Constitution and Other Historic Ships"; "Sky High — The Story of Aviation" (with Eric Hodgins, '22, formerly of The Review); "A History of Aircraft" (with same); "Behemoth — The Story of Power" (with same); and "Problems in Human Engineering." The article by Professor Magoun (p. 50) is drawn from an address delivered by him before the Fourteenth Annual Industrial Conference lately held at Pennsylvania State College. ¶ JOHN B. DRISKO, '27, has recently completed for The Technology Press a translation of W. Spannhake's "*Kreiselräder als Pumpen und Turbinen*" ("Pumps, Turbines, and Propellers").

HOLDER of 25 or more patents and author of seven books, JOHN MILLS, '09 (*A Balanced Ration of Work*, p. 56), is now Director of Publication for the Bell Telephone Laboratories. After joining the Bell System in 1911 he contributed to the earliest developments of transcontinental and transatlantic telephony. His interest in personnel problems derives from the personnel work he did in the laboratory unit of the System after the War. Last July, The Review erroneously credited Mr. Mills with the invention of a system for the multichannel transmission of orchestral music and its reproduction in auditory perspective. What Mr. Mills did do was to suggest the word *ceno-orchestra*, meaning "empty orchestra space," as a possible substitute for the large number of words which would otherwise be required to describe the system. Dr. Harvey Fletcher, Director of Acoustical Research for the Bell Telephone Laboratories, was primarily responsible for the *ceno-orchestra* system, and among others who contributed were E. C. Wente, '14, H. A. Affel, '14, E. O. Scriven, '11, and R. A. Miller, '20. ¶ JAMES HOLT, '18, is Assistant Professor of Heat Engineering at Technology. As teacher, researcher, and consultant, he is an authority on the mechanical equipment of buildings. ¶ Quotation from a letter written by a retrieved subscriber and obviously inspired by Professor Millard's article, "Falling Apples": "The posthumous October number of The Technology Review proved to be a falling apple which hit me on the head with such effect that I am enclosing a check . . . for the renewal of my subscription, cancellation of which probably crossed said apple . . . in Missouri. Drastic reductions in my magazine list will not include The Review. I particularly appreciated the pictures, 'Day's End' and 'A Dream of the Babylonians'."

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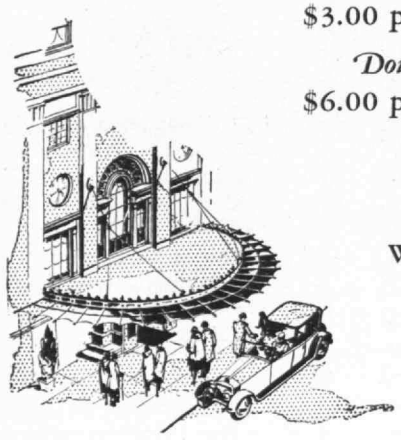
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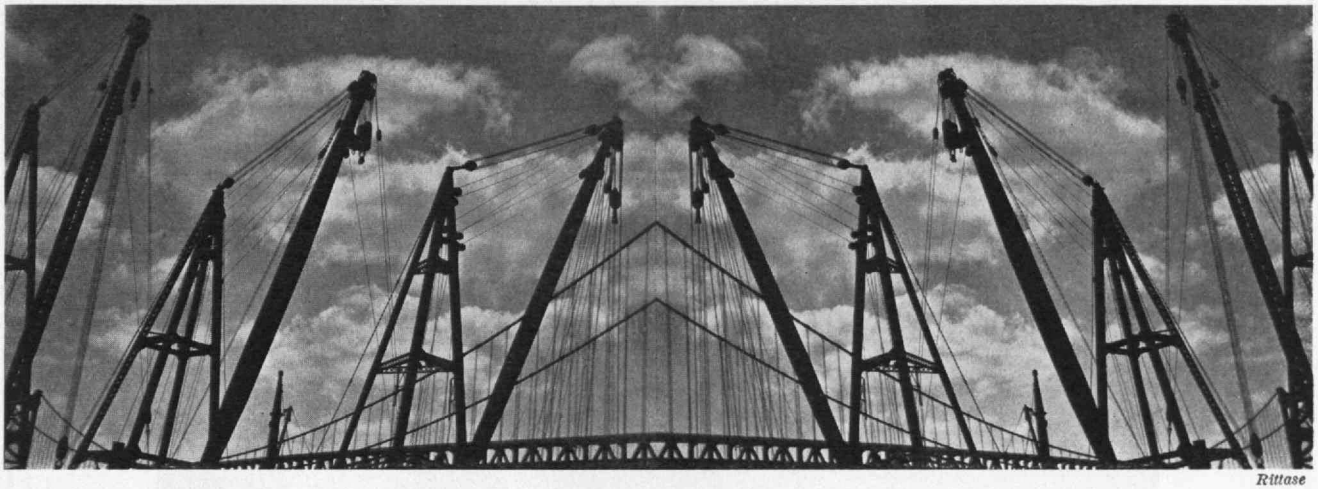
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The Technology Review

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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Rittase

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J. Rhyne Killian, Jr.

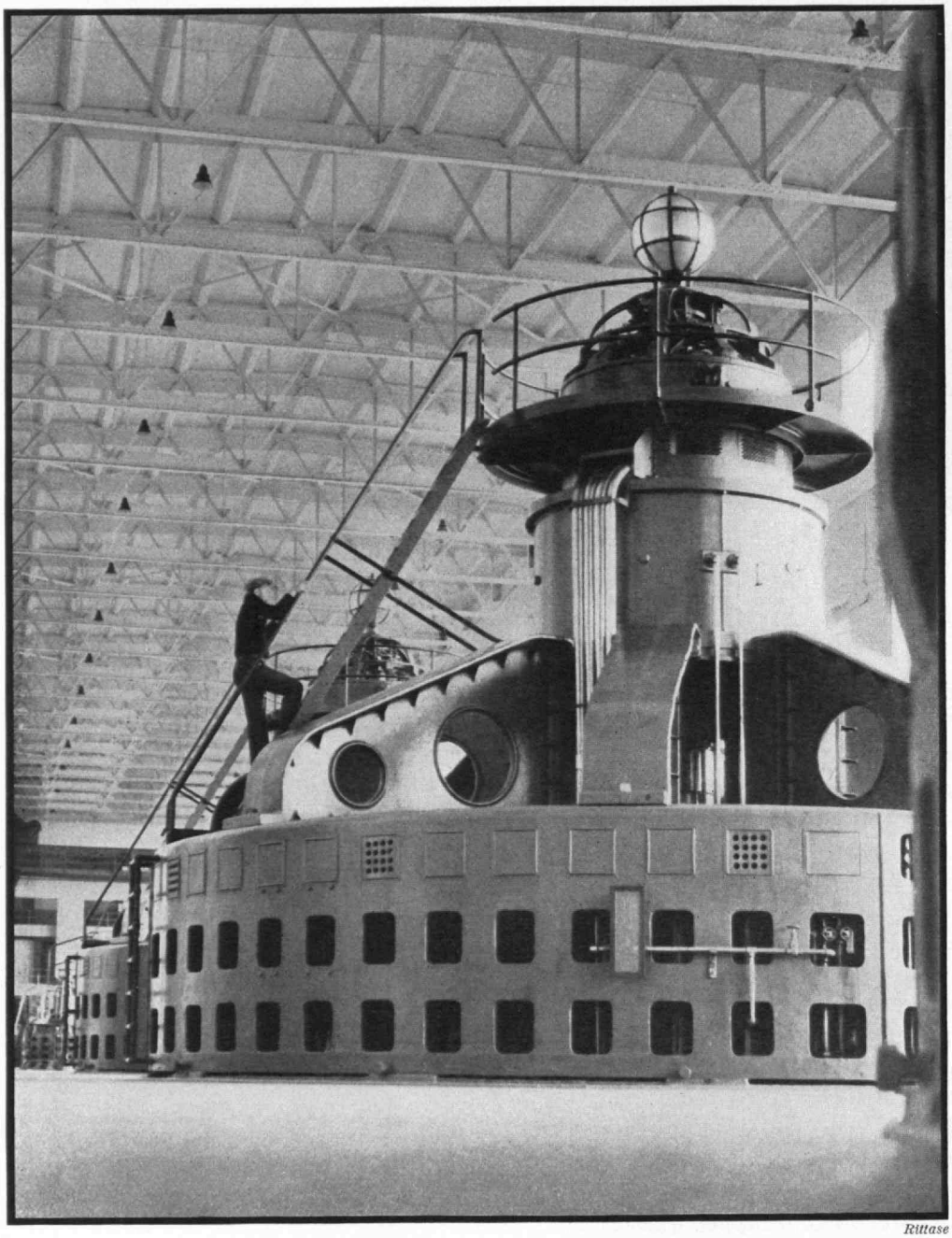
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Rittase

Generator Room, Wilson Dam (Muscle Shoals)

WILSON DAM vs. ONE POUND (*of matter*)

Physicists estimate, as Dr. Wiener points out in his annexed article, that one pound of matter contains (in yet unavailable form) about 11,300,000,000 kilowatt hours (over 15,000,000,000 horse-power hours) of energy. Wilson Dam, running at full ultimate capacity for a year, would generate only about one-third as much as that contained in a pound of butter!

THE
TECHNOLOGY
REVIEW

Vol. 36, No. 2

November, 1933

Putting Matter to Work

The Search for Cheaper Power

By Norbert Wiener

The Methods of Energy Storage — How the Strength of Materials Limits Power Storage — The Energy Stored in a Pound of Matter — Social and Economic Consequences of Cheaper Energy

ENGINEERING development has taken place in what seems at first sight to be two essentially different directions — the improvement of design and the improvement of materials. These two directions of improvement cannot be separated. We often think of Watt's steam engine as one of the greatest developments in engineering design and as, in a large measure, responsible for the century and a half of engineering progress which has followed it, yet Watt's engine could scarcely have been invented at any preceding period owing to the lack of engineering materials previously available and within the manipulative powers of contemporary craftsmen. Parenthetically, it is curious to reflect that the predecessors of our present mechanical engineers were the instrument makers and clock makers of the Eighteenth Century. The desire for accurate timepieces and instruments of navigation perfected the art of machining metals, and in particular cast metals, to the point where the accurate cylinders, pistons, shafts, and gears required by Watt's steam engine could for the first time be produced commercially.

There are two fields of engineering of great interest at the present time in which improvement in design is directly circumscribed by improvement in materials. I refer to the storage and the production of energy. These problems are inextricably united. We can never effectively tap such low-grade and fluctuating sources as wind and waves until we can concentrate and store the energy generated. Moreover, there is another direction in which the question of getting the largest amount of energy stored in an apparatus of a given bulk of a given weight has recently acquired an importance perhaps greater than it has ever had. The need for great economy of weight began to make its appearance really felt in the automobile and has become the dominating consideration in the airplane engine.

Indeed, the airplane was only made practicable by the invention of the internal combustion engine, a power plant of previously unimagined lightness and efficiency. I am not yet 40, but I can well remember the time when the flying machine was spoken of as a twin sister to the *perpetuum mobile*. Nevertheless, the idea of the flying machine is older than Leonardo da Vinci, and for a century before the successful experiments of the Wrights, more than one tentative flying machine had borne a form closely reminiscent of the modern airplane. It is unquestionable that some of these early airplanes could have been flown effectively, if insecurely, had they been equipped with an internal combustion engine of the type available to Wright.

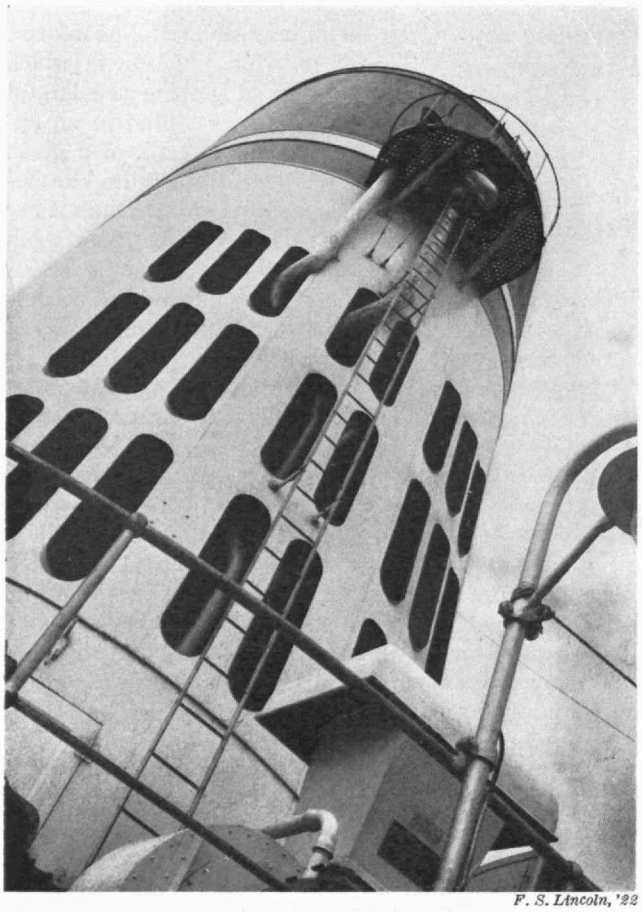
But the airplane, made possible by a great improvement in power plant, is awaiting a still greater improvement of the same kind to become a really first-rate factor in modern civilization. The one limitation that militates more than all others against the success of transoceanic flights, that renders them a sort of super-

athletic stunt rather than a routine commercial undertaking, is the excessive amount of fuel which they require, to the almost complete exclusion of pay load. The transatlantic flight is so near the limit of present possibility that it involves the double risk of an initial load too heavy for a take-off and of a terminal landing without fuel for power. It is hard to see how this difficulty can ever be met with present types of engines. The suggested use of vessels of various specialized types for intermediate landing platforms may indeed solve the commercial problem, but the engineering problems await some new development.

The nature of this development will obviously be some device whereby an abnormally large store of energy is carried in a relatively light apparatus. This engineering development also depends in equal measure on an improvement in technique and an improvement in materials. Let me discuss the problem of the storage of energy from a very general standpoint.

Among the various methods which may be adapted to this purpose are:

1. GRAVITATIONAL STORAGE: *clock weights, dams*
2. KINETIC STORAGE: *flywheels*
3. ELASTIC STORAGE: *springs, rubber cords, compressed air*
4. MAGNETIC STORAGE: *choke coils*
5. DIELECTRIC STORAGE: *condensers, Leyden jars*
6. THERMAL STORAGE: *storage boilers*
7. CHEMICAL STORAGE with electrical utilization: *accumulators*
8. CHEMICAL STORAGE with thermal utilization: *fuels and explosives*
9. ATOMIC STORAGE (not yet employed in practice).



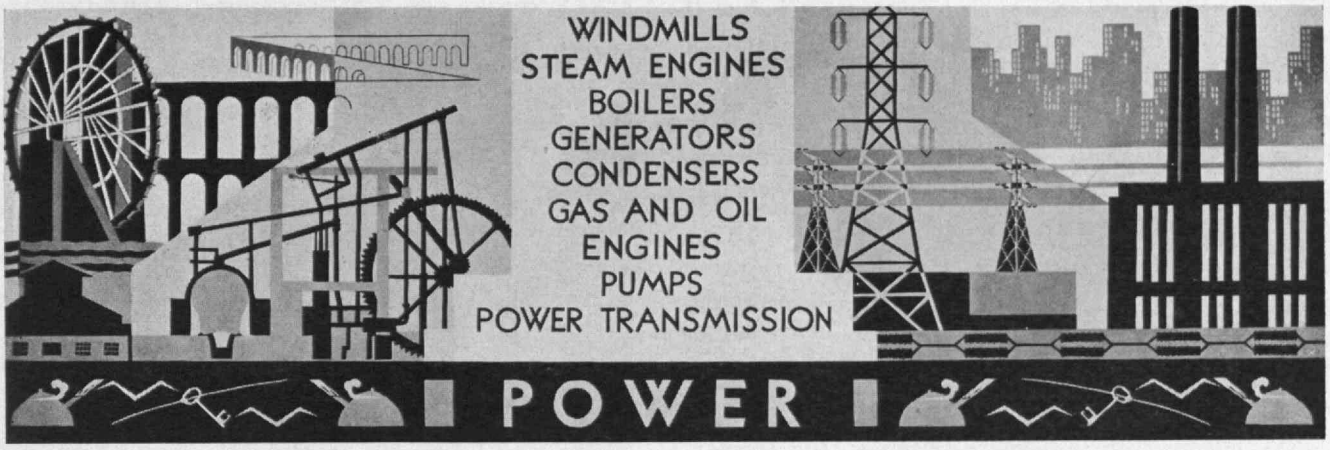
F. S. Lincoln, '22

A funnel of the S. S. Conte di Savoia

The limitations of gravitational storage are shown by the fact that an airplane when gliding from its ceiling uses up in a very few miles its entire available gravitational energy. Storage as kinetic energy is worth a more serious consideration. It is manifestly impossible to store any large amount of energy as energy of translation, and so energy of rotation in the form of the energy of flywheels is the only kind worth discussing. Now the flywheel has a very definite limit of speed which is determined by its shape and size and by the strength of the materials used. Thus, any improvement over the relatively small amount of energy which may at present be stored in flywheels is directly dependent on an improvement in the mechanical strength of metals available. We leave the consideration of friction out of account entirely, although in practice this is by no means negligible, for windage can be practically entirely eliminated by a vacuum mounting and pivot friction can be greatly reduced by the use of very hard bearings, such as jewels. Here again, however, questions of strength of material are the dominating ones, for the friction of a pivot can be cut down still further by the discovery of still harder and tougher substances. At any rate, until we have some improvement in materials, we have already realized the maximum storage of energy per pound obtainable in kinetic form.

Elastic storage depends even more obviously on the properties of materials. The amount of elastic storage possible in a pound of material under a given type of stress is obtained by integrating the deforming force with respect to the deformation up to the point of permanent set, which we call the elastic limit. This maximum density of energy will be independent of the shape of the piece of material stressed. If we halve the cross-section and double the length, we halve the force and double the deformation for a given force. This is a constant for the material and the type of strain—tension, compression, or shear. It is greater for a pure strain of one of these types than for any bending or torsion which does not strain the parts of the material equally.

The amount of energy which may be stored per unit mass is quite low in most materials and the maximum is already attained in practice. Steel has great strength but the strain at the elastic limit is small. We all know the relatively small amount of energy per pound which can be stored in the springs of an automobile, which break at a point at which the stored energy is only enough to propel the car a few feet. Of all materials, rubber has the greatest power for the elastic storage of energy. While the elastic limit in the sense of a limit of linearity of the stress-strain relation is reached fairly soon, rubber can be extended several times its own length before requiring any great degree of permanent set, and this is what counts. The changes undergone by rubber in stretching seem to be of a complicated character and are perhaps not to be called purely elastic. The molecule of rubber appears to have an entirely different mode of absorbing energy when stretched than does that of the ordinary material. Indeed, rubber as an elastic material offers a rather interesting analogy to



From a sequence of mural panels by David Leavit in the Museum of Science and Industry, Chicago

ferromagnetic materials and to rochelle salt as a dielectric, an interesting substance on which Professor H. Müller, of Technology's Department of Physics, is now working. These materials seem to differ in kind rather than in degree from normal paramagnetic substances and dielectrics, respectively, and to possess an anomalous capacity for storing energy in some molecular way.

Thus, the rubber launching cord of the glider represents about the best that is in immediate prospect for the elastic storage of energy in solid bodies. It might be thought that fluids which lack an elastic limit offer greater possibilities in this direction; the pneumatic storage of energy is a well-recognized method. Here, however, the limiting factor is the strength of the containing tank. Let us assume that we have a material of a given strength in the form of a hollow sphere. The maximum pressure per square inch which the sphere can hold is proportional to the maximum stress per square inch which the fibers of the tank can hold multiplied by the ratio of the thickness of the walls to the radius of the tank. Thus, the weight of the tank must bear a certain, definite ratio to the volume of the contents multiplied by the pressure; that is, the weight of such a tank is nearly proportional to the greatest amount of energy which may be stored in it.

While pneumatic tanks are often used in practice and, in the case of boilers, I am sorry to say, are sometimes stressed to near their elastic limit, there are certain tanks which are stressed beyond their elastic limit at every use. I refer to the barrels of artillery pieces. If we compare the weight of a gun with the weight of its powder charge, we shall get a feeble measure of the limitations of the pneumatic storage of energy in comparison with its storage in chemical substances, such as explosives. Any improvement in this regard must be an improvement in the materials available.

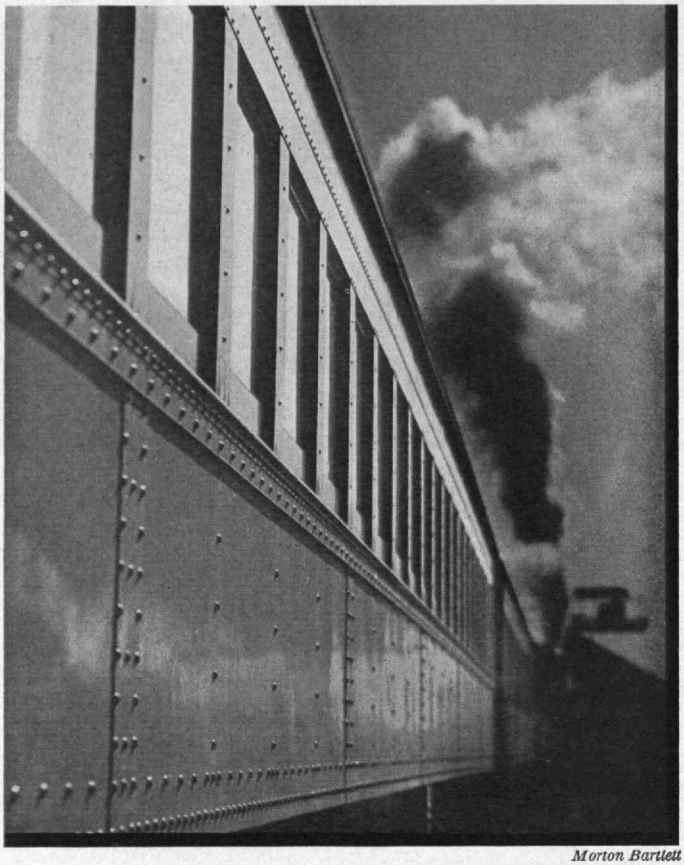
Even with the high permeabilities now attained, the saturation point of magnetic materials is too low to make this a practicable form of storage for large quantities of energy. If the magnetic material is replaced by a vacuum, which has no saturation point, the vast amount of conducting material necessary to produce a really strong magnetic field without the aid of ferromagnetic materials is more than prohibitive. In addition, the magnetic forces on the conductors in such a case are so great that we should soon reach a limitation to the amount of energy stored per pound quite analogous to that in the case of pneumatic storage.

The same sort of thing appears in the dielectric storage of energy. Rochelle salt has too low a saturation point to be really useful. Most other materials have too low a dielectric constant to store a large amount of energy per unit weight before their breakdown. A vacuum, or gaseous dielectric, involves the problem of supporting the conductors against the electrostatic forces urging them together. This is a problem of exactly the same sort as that of the storage of energy in a pressure tank. Probably the limited amount of energy which can be stored per pound of apparatus is not many times greater than what we find in the pneumatic method.

Thermal storage will not furnish a way to store energy to be compared with the direct utilization of fuel until a substance is found with latent heat of fusion or vaporization comparable with the heat of combustion of gasoline. No such substance appears to be in sight.

Electrochemical storage of energy has perhaps been most satisfactory. The old lead accumulator holds its own against any more modern types of storage battery, yet it contains at least 30 times less energy per pound than is available in gasoline. The electric automobile has never yet managed to live down the handicap of overweight. As to chemical storage of energy with thermal utilization of the energy, gasoline can, of course, be improved on, but no improvement is in sight which will change the order of magnitude of the amount of energy stored.

THERE thus seems to be comparatively little hope for the improvement of the storage of energy by what may be called classical methods, at least until materials have been discovered of strength hitherto undreamed of. In the absence of such materials, our one hope probably lies in atomic energy. Here the problem of the storage of energy blends with the problem of the generation of energy. If modern physical theory speaks the truth, we see all about us the storage of energy in the most concentrated of all forms, that of matter. A pound of matter has 11,300,000,000 kilowatt hours of energy in it, while a pound of gasoline as used in an internal combustion engine has at most (*Continued on page 70*)



Morton Bartlett

Training for

Are Weaklings Bred by Our

BY F. A.

LEADERSHIP is not a unified quality in and of itself, but rather an integration of many qualities; the number required being a direct function of the altitude on that old mythical ladder of achievement. That leaders are born and not made has been so often declared as to carry the weight of traditional authority, yet despite its antiquity the statement is now being challenged by a growing body of competent opinion. I do not mean to imply that a good brain — that instrument which is the basis of intelligence — can be conferred by any miracle of training or that the weakling can be endowed with energy by the laying on of hands. The biologists realized long ago that from the time a boy is little more than a gleam in his father's eye, the quality of his brain and the quantity of his energy are practically determined. But the psychologists are demonstrating with ever-growing strength that how the boy uses these endowments is entirely a matter of training, in its broader sense, and has no connection whatsoever with heredity.

We too often lose sight of the fact that the only things we inherit are physical; that babies come into this world naked in mind as well as in body; all little barbarians with no conditioned reactions, no realization of the rights of others, no comprehension of the social order. The concepts which gradually dominate their habit patterns are entirely a matter of environment. Thus, by an exchange of early surroundings, a Capone might easily have been a Schwab or a Schwab a Capone. Both the steel master and the beer baron have native intelligence, energy, and a genius for organization; the main difference being that somewhere in early youth one was given an anti-social twist in his thinking. He never learned that confidence and trust are the basis of all correct human relations.

Thus it is not necessarily how brilliant or how energetic a boy is that determines his rung on the ladder, but quite as much how he handles himself. That he shares father's sense of humor or mother's habits of orderliness are not at all matters of inheritance but entirely matters of conditioning by environment.

What then are the qualities which must be nurtured if we would produce an enlightened leader? Given a good brain and a sound body to start with, the essential elements seem to me to be knowledge, skill, and a coöperative mental attitude. Knowledge is knowing what to do, skill is knowing how to do it, and a co-operative mental attitude is the *sine qua non* of our increasingly complex organizations.

The postulate that knowledge, as indicated by superior scholastic achievement, is not an important requirement of any save intellectual leadership, has often been advanced without serious contradiction. But no opinion is worth more than the facts that back it up. A recent study of 1,000 M. I. T. graduates made by A. Anable, as published in *Chemical and Metallurgical Engineering* for February, 1933, showed that the men who earned the highest salaries were executives who had been well above the average in college grades and especially good in their thesis work.

The following study of Technology men listed in "Who's Who in America" and "Who's Who in Engineering" is also suggestive:

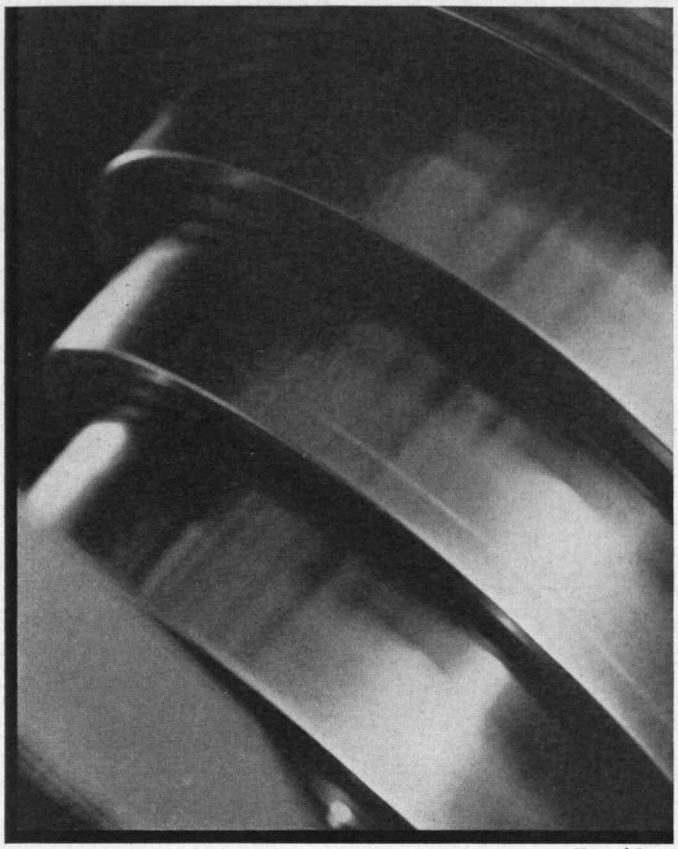
	"Who's Who in America"	*"Who's Who in Engineering"*
Bachelor's degree in four years...	57.6%	70.0%
Bachelor's degree in five years....	3.7%	4.1%
Total bachelor's degrees.....	61.4%	74.1%
No degree after four years or less.	26.2%	12.3%
No degree after five years.....	1.2%	1.2%
Total no degree.....	27.4%	13.6%
Percentage of total registration receiving B.S. degrees.....	39.3%	

The percentages in this table are quite properly incapable of being combined to give 100 because both volumes contain biographies of men who did only special work or graduate study at M. I. T.

Let those who point with triumph to the fact that only 60% or 70% of these distinguished men received a bachelor's degree reflect that the chances of earning the degree were only two out of five.

Like leadership, of which it is a part, skill in handling human beings is itself compounded from many traits such as courage, imagination, emotional stability, and a sense of justice.

No parent desires his boy to be a coward, yet the father who rules by intimidation is training his son



Howard Lester

Leadership

Modern Scholastic System?

MAGOUN

to be exactly that. There is no more powerful way of indoctrinating a boy with the idea of governing or being governed by force. This is cowardice, not courage. The mother who continually screeches from the back porch in order to protect her precious Willie from the urchins next door is guilty of parental propping, which is not training for leadership, but training for servitude. And the executive who weakens a subordinate by thinking for him is just as guilty of parental propping as an oversolicitous mamma.

The parent or the executive who would give his charge the courage of a leader must first give him self-reliance. How? Exactly as the child was given the ability to walk, through the combination of proper nourishment (both physical and intellectual) plus correct exercise. At the earliest possible moment he was encouraged to toddle across the floor with only enough assistance to insure some success. Then he was allowed to go at it on his own, in spite of the foregone conclusion that he would bump his nose. Eventually he could walk with confidence. Skill comes only with practice, no matter what the field of endeavor.

The courage of leadership is the courage of believing that you can handle a situation adequately and it comes only by handling situations adequately. Moreover, youth is magnificent when given responsibility in assimilable doses. Who would believe that a girl not yet 11 years old could do the family buying — not just errand-running to the store, but unsupervised planning and purchasing on a budget; could come home to an empty house every noon to cook a hot luncheon for herself and two younger brothers; could make the culinary preparations for dinner (once expanded to the proportions necessitated by a party of ten), carrying the whole thing off with no assistance except that of a busy father who never arrived home till 6:30! And for those six weeks while the mother was in Europe, the nine-year-old son ran the furnace with entire success (save for taking out the ash barrel), while the youngest boy kept the vacuum cleaner busy. The only outside help was provided by a competent colored woman who came once a week to do the ironing.

That is the sort of nourishment, plus exercise, which *is* training for leadership. There are no "sitters" and no "wishers" among children who have not learned, by being shielded from responsibility, to be afraid of life.

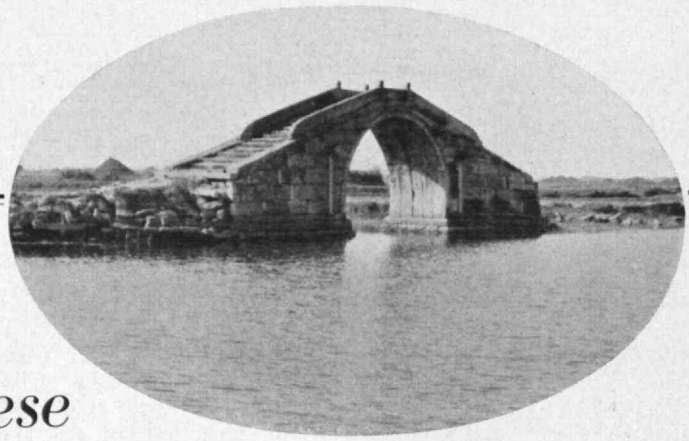
TEACHERS do not intend to breed intellectual weaklings, but our scholastic system makes this result the rule and not the exception. Between the kindergarten and the graduate school the student must regurgitate the ideas of his schoolmasters or be punished by a marking machine which is theoretically an index of achievement but actually little more than a threat. At the two extremes of education the student may do things on his own. Why not during the entire process? It seems to me far better that he should come to an inadequate solution by thinking independently than that he should merely swallow ideas some one else has digested for him. If the student does not possess intellectual courage, he can hardly hope to possess either truth or the qualities of leadership. If he reaches a wrong conclusion by unsound reasoning, he can be converted to a better conclusion by further experience and better reasoning; but if he reaches a conclusion by blind imitation, neither better reasoning nor more experience can change his stubborn grasp on a belief he knows not why he believes.

I repeat: our scholastic system breeds weak people. Intellectual growth is as truly dependent on proper nourishment and proper exercise as is physical growth. We gorge the student with what we believe to be correct intellectual nourishment; we deny him correct intellectual exercise. Result: cranial obesity.

How can he achieve courage? How can he develop imagination? Certainly not in class rooms or business organizations where the instructor is a boss extracting a little sour obedience like a lemon squeezer, instead of a leader inspiring his students to the realization that education is a great adventure.

Between the first grade and the cap and gown, the average college graduate has studied under 60 or 70 different school teachers. It is charitable to suggest that the fingers of one hand would be required to count those who really taught; who were really gardeners of the mind, cultivating the buds of growing personality. The explanation of this lies in (*Continued on page 68*)

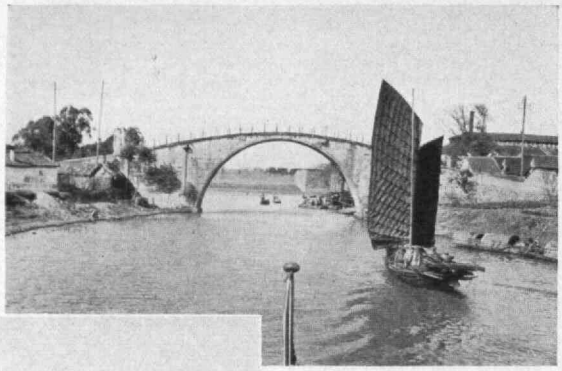
Ancient Chinese Arches

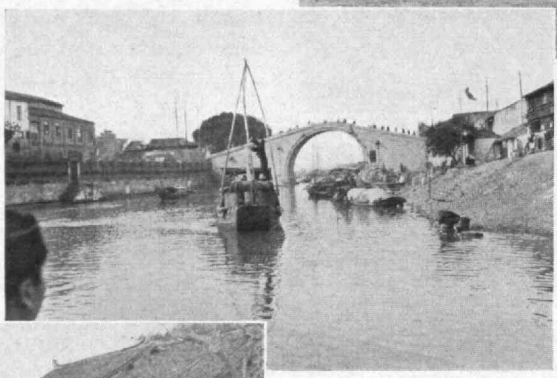


Abandoned bridge in Yangtze delta region, just back of Shanghai. Notice graves (mounds) in background

FROM PHOTOGRAPHS BY JOHN B. DRISKO

Arch bridges were probably built in China prior to the Roman era (as early, even, as 2000 B.C., according to one historian) and many refinements in bridge design were in use there long before Europe employed them. Knowledge of Chinese bridges is meager, despite their boldness and beauty, and The Review presents with pleasure these five unpublished photographs





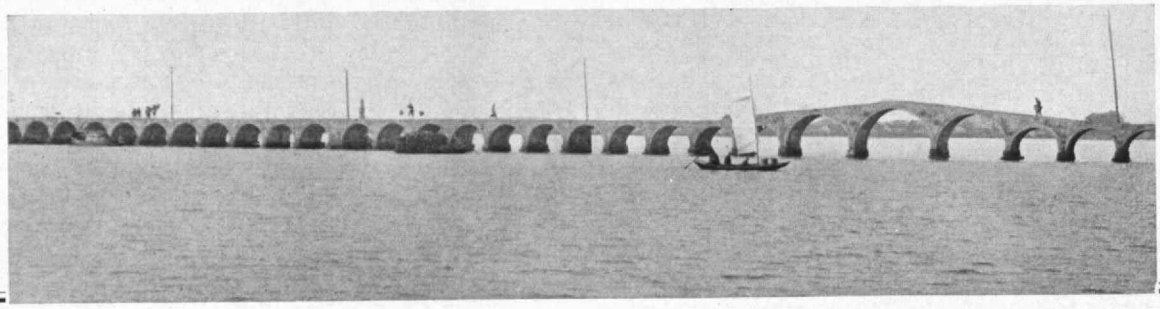
Above: Bridge over Grand Canal as it enters south side belt canal around Soochow. Soochow city wall may be seen through bridge

Left: Arch bridge near Soochow



Left: Bridge over the "Main Street" of a small Chinese village, situated between Shanghai and Soochow, just off of Soochow Creek. Notice stone columns under buildings

Below: View of a portion of the Marco Polo bridge, a 53-arch bridge which runs parallel to the Grand Canal, and separates it from the Tai Hu, a large lake near Soochow. The Grand Canal is about 1,200 miles long. A portion of it was already completed in 486 B.C. and the whole canal was finished in 1283 A.D.



THE TREND OF AFFAIRS

IN THIS SECTION: *Sunflower Sugar (53); Significance of Heavy Water Experiments (53); Science Forecasts (54); Centrifugal Pumps — Servants of Progress (55); Classifying the Work Men Do (56); Physiological Basis for Tailored Weather (58)*

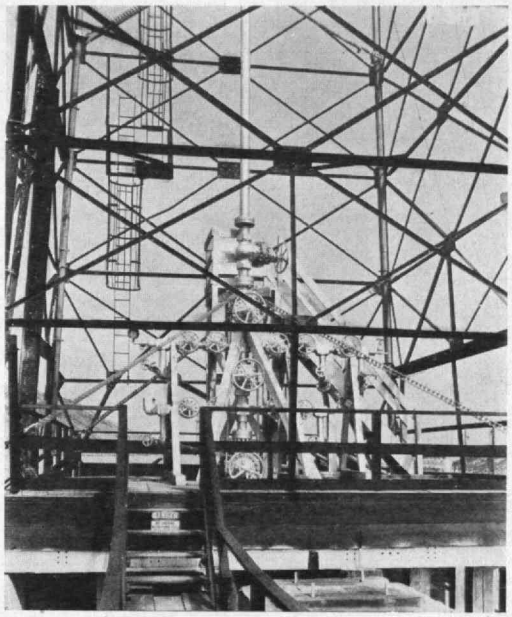
Sugar from Weeds

LEVULOSE (or laevulose, a name arising from the fact that solutions of the substance are laevorolatory, i.e., rotate the plane of polarization of light to the left), the sugar of many fruits and plants and the substance that gives honey its cloying sweetness, may soon take its place on the dinner table as a formidable competitor to *sucose*, the sugar of cane and beets.

Common in plants to an amazing degree, yet unfamiliar to the layman as a sugar, levulose is now being produced in commercial quantities, as the result of research at Iowa State College, from the common Jerusalem artichoke or wild sunflower. This sugar substance is also present in dahlias, chicory, dandelions, the common burdock weed, goldenrod, wild onions, and many other humble and easily grown plants.

Levulose is approximately 50% sweeter than other sugars now available; it has a delightful flavor, and it possesses properties which result in its being more quickly assimilated by the body than its sister sugars.

The delicious flavor of honey and the sweetness of grapes is due to the presence of levulose, and because of this it has been called fructose, or fruit sugar.



Petroleum World

Recent oil developments include the bringing in of the world's fourth and most powerful gusher (140,000 bbl. per day) at Lok Baton, U. S. S. R., and the drilling of the world's deepest well (nearly 11,000 feet) in California

Levulose has long been known to chemists and has been produced in limited amounts for use in cough medicines, for the preparation of infant foods, and for other therapeutic purposes. Its production on a large scale had not been successful, however, until research at Iowa State College developed a satisfactory process.

As a food and sweetening agent, levulose has many uses. It is particularly suitable for beverages, cakes, pastries, and candies, in which the desired carbohydrate content may be attained without producing an unpalatable sweetness. In confectionery, for instance, it is possible to produce candy which contains less than half a pound of levulose sugar to a pound.

The quality of jams, jellies, and marmalades is said to be greatly improved by the use of levulose, and "sandiness" in ice cream is prevented by incorporating a small quantity.

Because of its high solubility, levulose is an aid to preventing the crystallization of other sugars, and the undesirable granulation of honey, one of the major problems of producers, is stopped by adding a small amount of levulose to the natural content of the substance. In the crystalline form, it could be mixed with dextrose (corn sugar), thus sweetening the latter, and, if mixed in syrups, producing an imitation honey.

In canning, levulose brings out and preserves the natural flavors of many products, particularly fruit, and its use for bottled beverages is said to assure uniform and permanent flavor characteristics. In syrup form it has an unusually pleasant flavor. Its therapeutic uses are now being studied, particularly its use in diabetes. Certainly its greater sweetness suggests its value in carbohydrate-restricted diets because small amounts will satisfy.

▲

M. Georges Claude has turned from power generation in Cuba to ice-making in France. Taking advantage of the buyers' market in dismantled warships, he has bought a 10,000-ton derelict and is refitting it as a floating ice plant, for which he plans to supply power by the Claude-Roucherot process of utilizing the temperature difference between surface- and deep-sea water. He expects to operate his floating ice plant economically on a temperature difference of 10°C.

Poison Water

PERHAPS the outstanding contribution of the year to the science of chemistry has been the study of heavy water by Edward W. Washburn, '05, and Gilbert N. Lewis. Lewis's recent description of a method for the analysis of heavy water, a technique for determining the amounts of heavy hydrogen and heavy oxygen which it contains, is an account of a brilliant piece of experimentation. The principles of his method are such that they can be made clear to any intelligent person who will give thought to them, and no previous knowledge of chemistry is necessary in order to understand them.



Brubaker

Airport in a river. The Swan Island Airport, Portland, Ore. Majestic Mt. Hood may be seen in the background

It is a characteristic of great experimentation that it involves only the simplest of logical principles. Its significance can be understood without the technical knowledge of the specialist. Of this sort was the work of Faraday on electricity and that of Pasteur on disease and immunity, and more recently the experiments of Richard C. Tolman, '03, in which he found that a current was set up in a previously moving conductor when the motion of the conductor was stopped, and in a previously stationary conductor at the moment that it was set in motion. It was inferred that electricity therefore possesses inertia, the fundamental quality of mass. The significance of a great experiment may thus be told in scarcely more than a sentence.

Lewis added to his heavy water a substance, ammonia, which contained hydrogen and which interacted with the water in such manner that the hydrogen originally present in the water and the hydrogen originally present in the ammonia was immediately distributed indifferently between the two substances. The ammonia now containing some of the heavy hydrogen was removed, and the process was repeated until finally the water had been deprived of all of its heavy hydrogen. Similarly, sulphur dioxide, which interacted with water in such manner that its oxygen and the oxygen originally present in the water became distributed indifferently between the two substances, was used to remove heavy oxygen.

Heavy water will open the way to a better understanding of the manner in which the inside of the atom determines the physical and chemical properties of an element. Heavy hydrogen is uniquely and preëminently qualified to assist the attack on the problem.

In 1815 and 1816, William Prout put forward the hypothesis that the atomic weights of all of the elements are multiples of the atomic weight of hydrogen and are to be represented by whole numbers if the atomic weight of hydrogen is taken as one. The suggestion provoked considerable discussion and experimentation. The hypothesis was adopted and defended by a number of chemists, but was finally rejected because repeated careful determinations of the atomic weights of the elements showed that most of them were properly to be represented by fractional numbers.

About 20 years ago, T. W. Richards determined the atomic weight of lead from radioactive minerals and found it to be indubitably different from the atomic weight of ordinary lead. The difference, however, was but a very small part of the total atomic weight. The lead from radioactive minerals was identical with ordinary lead in its chemical properties, and was said by Soddy to be an "isotope" of lead, because it had the same atomic number. By careful measurements Richards was able to show that the isotope differed from ordinary lead in density and in compressibility, and that the differences corresponded to the difference in atomic weight.

The opinion now prevails that all atoms of whatever kind have weights which are multiples of the weight of the hydrogen atom. The fractional atomic weights which the elements seem to possess result from the circumstance that the elements as they occur in nature consist of a mixture of isotopes.

The isotope of hydrogen which occurs in heavy water has twice the atomic weight of ordinary hydrogen, a situation which could not occur in the case of any other element. It offers, therefore, a unique opportunity for the study of the chemical and physical differences between isotopes and hence of the inner causes of the external and palpable qualities of matter. The isotope of oxygen which occurs in heavy water has an atomic weight of 18 as against 16 for ordinary oxygen.

Heavy water has been procured by the electrolysis of ordinary water; hydrogen and oxygen escape and the heavy isotopes tend to remain behind in the water which is not decomposed. Does this mean that a greater electrical potential is necessary to discharge an ion of heavy hydrogen than to discharge an ordinary hydrogen ion, and hence that there is a chemical difference between the isotopes? Or is there merely a difference in the mobility or sluggishness of the ions, corresponding to the difference in their mass? Lewis has found that heavy water is toxic to plants. Tobacco seeds do not germinate when moistened with it. Professor Swingle of Princeton has since found that fresh water fish and worms die in heavy water within a few hours. The scientific world is eager for the things which a further study of heavy water is certain to give it.

Prophecies

UNDISMAYED by the economic uncertainties of the moment, forward-looking seers of science and engineering are fixing their gaze upon the datum line of

new horizons and finding much to report. Whether the realization of their predictions comes tomorrow or day after tomorrow is of less importance now than the refreshing preponderance of optimistic prophecy. Here are random examples:

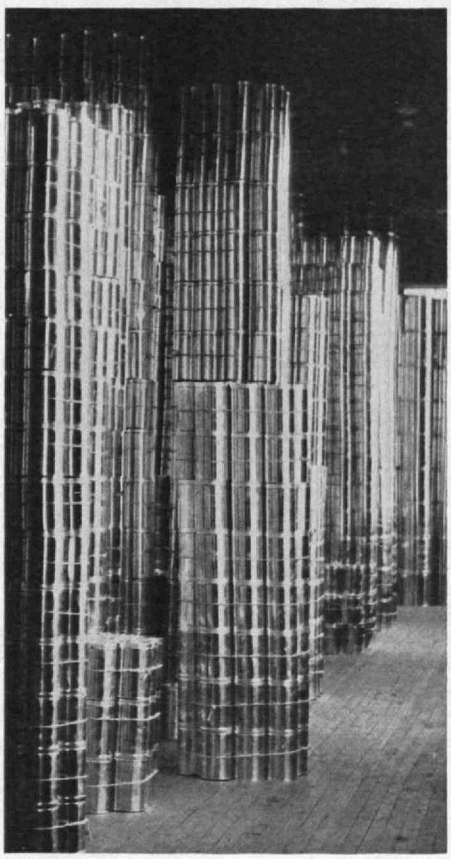
Item. Professor H. C. Sherman of Columbia University, addressing the American Chemical Society recently, expressed the opinion that advances in the chemistry of nutrition will add substantially to the expectation of life. Men of the future may be more powerful constitutionally, with a life expectation of 77 years instead of 70 as at present. These changes are expected to come through greater knowledge of the energy relations, the protein chemistry of nutrition, the mineral elements, the vitamins, inter-relationships between the various nutrition factors, and the principle that in the chemistry of nutrition the nutritional reactions of the living body as a whole are of paramount concern. Dr. Charles H. Mayo speaking last month before the American College of Surgeons echoed Dr. Sherman's forecast by again predicting a longer life span.

Item. Regular transoceanic dirigible passenger service awaits only an improvement in business conditions, Dr. Hugo Eckener, commander of the *Graf Zeppelin*, which has already made several transatlantic crossings, said recently. A new German Zeppelin to be powered with Diesel engines is now being built and will fly on a regular schedule between Germany and South America. She will carry 55 passengers in contrast to a capacity of 22 for the present ship.

Item. Bridges with single spans a mile long, which is 1,000 feet longer than any now existing, are now in prospect as the result of advances in metallurgy and new conceptions of design, predicts Dr. D. B. Steinman of New York. The bridges of the future are expected to be built of colored metals and shining stainless steel. The proposed Liberty Bridge across New York Harbor would have a single span of 4,500 feet, suspended by two 48-inch cables supported on towers 800 feet high. It would be the world's largest bridge, with a clearance of 235 feet above the harbor.

Item. In speaking of levulose (*vide supra*), Dr. William J. Hale, director of research for the Dow Chemical Company, prognosticated: "The engineering problems necessary to insure the successful operation of a levulose plant on a commercial scale are still to be worked out; a few months' time and a few thousand dollars will guarantee the success of the enterprise. The result is staggering to the imagination; it means the utter banishment from our tables of all cane and beet sugar, and the directed efforts of thousands upon thousands of our farmers toward the supply of our entire needs for sugars — not alone levulose, but its counterpart, dextrose, derivable from corn."

Item. President Richard W. Allen, C.B.E., in his address before the Engineering Section of the British Association for the Advancement of Science, spoke at length on mechanical developments. Said he, "There is boundless scope for the application of the Diesel engine, both actual and potential. Its low initial cost, the limited space required for its installation, the ease of starting from cold, and its low costs of operation and maintenance, are all contributory to its great industrial exploitation, particularly for such public services as water and electricity supply, sewage and drainage, apart from industrial application. For marine purposes the Diesel engine is making steady progress in its adoption for the main propelling machinery. With its convenience and reliability for auxiliary purposes, it is so widely appreciated as to require only passing mention here. Examples of this type of plant are to be seen in many modern passenger ships. The recent development of a high-speed engine, combined with small size and low specific weight, make this engine particularly suitable in railway work for locomotives, where low operating costs and low standby losses are essential. This is a sphere into which the Diesel engine in our country has only recently entered, but its singular suitability for this type of service encourages one to expect rapid strides to be made in this direction. So far as industrial road vehicles are concerned, this type of oil engine has come to stay, while its resilience of running has permitted its installation in crowded residential areas — even in the basements of steel structures consisting of flats, where freedom from noise and vibration are imperative. There seems, indeed, to be no limit to the sphere of utility — of necessity, even — for this prime mover."



W. M. Kimball

Architectural form in terms of tin

▲

California is sponsoring another colossal irrigation project. It proposes to transfer water from the Sacramento River to thirsty San Joaquin Valley. The main dam will be located near the point where the confluent Pitt and McCloud rivers join the Sacramento. It will be in height 420 feet; in cubic content, as large as Boulder (Hoover) Dam. Estimated cost: $170,000,000.

Civilization's Debt to Pumps

WE HAVE heard much on the contributions to civilization made by the bridge, the radio, the lighthouse, the lathe, even the town pump. Overlooked in all of these eulogies has been the lowly centrifugal pump. This lack of recognition of one of man-





Above: Current-driven irrigation pump, Turkestan. Below: Chigir, primitive animal-driven irrigation device, Turkestan. See adjacent article

kind's most potent mechanical servants was inferred in the address of President Allen mentioned above.

It is probable that centrifugal pumps began to be used for industrial purposes early in the Nineteenth Century, but even as late as 1850 they were regarded as a mysterious novelty. It was not until 1875, when Osborne Reynolds suggested the multi-stage turbine centrifugal pump, that it started its rapid climb to preeminence as a pumper of all types of material, even coal, sands, gravel, and the like.

"Technical developments," noted President Allen, "have amazingly increased the field of application of the centrifugal pump, particularly for graving and floating docks, impounding for wet docks, and in the drainage of watery wastes and the irrigation of barren deserts so as to bring large areas of ground previously unproductive into a state of high fertility — often affording, indeed, a sure means of subsistence to peoples whose very existence had hitherto been precarious. In our own country, before the beginning of the present century, only a comparatively small area of the fenland had been drained, and then almost entirely by antique methods, as by scoop wheels driven by windmills or beam engines, whose efficiency was in inverse ratio to their æsthetic value. Here the development of modern steam and oil engine-driven centrifugal pumps has supplied a considerable impetus to reclamation. In China and Japan, great areas of waste land have similarly been drained and brought into cultivation.

"The economic advantages of irrigation work in Egypt and the Sudan are familiar to many. In Egypt, during the last 50 years, the developments have been very remarkable for their size and number of installations. Only after a visit to that country can one fully appreciate the vastness of the enterprise and the work carried out there by the engineer. In the Sudan, irrigation schemes date from the Battle of Omdurman, when the power of the Mahdi was broken by Lord Kitchener, and the tribes of the Sudan, whose previous occupation had been largely that of war, had somehow or other to maintain themselves in a country ill supplied by nature with the means of peaceful existence. The suggestion that cotton could be successfully grown in the Sudan, followed by the construction of experimental pumping stations — even so far afield as Fashoda — was crowned with success, leading to the foundation of the Gezira Irrigation Scheme and to the formation of the Sudan Plantations Syndicate, so that today the Sudan furnishes a considerable proportion of the world's supply of this commodity, and of the highest quality. In many other countries, as Australia, New Zealand, and elsewhere, irrigation methods only possible by the installation of modern pumping plants have resulted — as, for example, at Mildura — in the development of Australia's great fruit-growing industries.

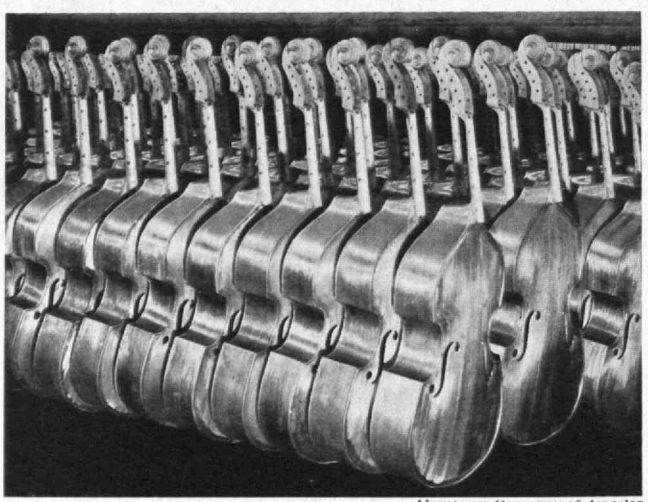
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Diethylaminoethylparaminobenzoate hydrochloride is one of the chemical names for procaine, *a local anæsthetic.*

A Balanced Ration of Work

BY JOHN MILLS

SPINACH and orange juice, symbols for earnest dietitians and conventional humorists, have their place in balanced rations. But for most of us, between the years of gorgeous and failing appetities, the ration is empirically balanced. Large variations may be tolerated from meal to meal or day to day. A menu card may



Aluminum Company of America

Bull fiddles, modern style. Aluminum base violins are rapidly gaining popularity because of their remarkable tonal quality and their imperviousness to moisture

suddenly discover a devouring interest in lamb fries or tripe — an aperiodic weakness, unconfessed at home. Mere "spot sampling" would never disclose the balance, for it is unconsciously adjusted and temperamentally our own.

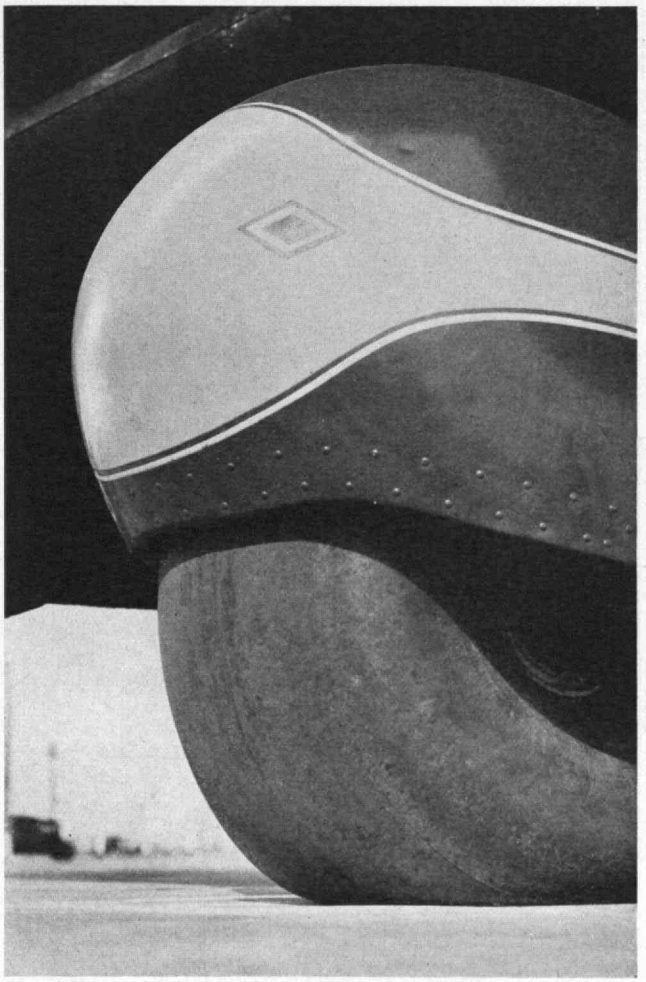
Similarly individual are the satisfying rations of work we each seek instinctively when the prescriptions of school curricula no longer apply. Within the limits of freedom which our economic situations permit, and hampered by the "job specifications" of our positions, we carry on as best we may. Some tasks we relish; others seem distasteful. Conscience and duty may keep the spinach in our diet; but rationalization can soothe. Some work we may slack for more whole-souled fervor in other operations.

Rarely have employer or employee analyzed work in terms of its component types. A name only has been applied to the job: file clerk, president, salesman, or research chemist. Skills, previous experience and training, which are, of course, necessary bases of selection, describe the work in tenders of employment framed by boards of directors, employment managers, or industrial psychologists, and as understood by the applicants themselves. These are well recognized and accepted procedures, but they fail to disclose the ration of work which the position involves, although it may always be assumed that the higher sounding titles represent more freedom in individual adjustment.

College graduates and engineers, for whom the market until recent years has been very brisk, have been widely bought and sold under those classifications, with certain supplementary trade terms, as "electrical" and "mechanical," in the case of those with more specific skills and training. Nevertheless, in any industrial organization in the country which employs more than a hundred engineers there will be found between some two engineers of the same classification greater differences in type of work than between some other pair of different classification. Our terminology is not definitive; and work, like food, needs description in terms more related to the human organism. No single system of classification will suffice, but probably some recognition should be accorded to temperamental differences in ration of work. Can work be resolved into more or less fundamental types, on the basis of which individually satisfactory requirements can be expressed? Work may be divided broadly according to whether there are involved human relations and personal contacts with others, as distinct from such impersonal contacts, for example, as the printed page affords. Work then may be said to be either collective or individual. In the latter case four subdivisions appear, somewhat inadequately described by the terms *study*, *creation*, *mental routines*, and *physical routines*. The first two of these need no explanation and the last two only a word as to their inclusiveness. The term *mental routines* is applied only to operations where the element of novelty is absent and the processes of learning are essentially completed. The calculation of one's income tax is a mental routine because the arithmetical processes are no longer to be learned but only practiced. All instances where hand or foot is called upon to coördinate with eye or ear are, of course, physical routines only after they are learned.

Collective work, on the other hand, seems so varied as to defy convenient subdivision. At least this is so when the problem is attacked objectively; but approached subjectively it yields an illuminating classification. Human relations on the part of any individual may be separated by the criterion of equality. One's relations at any moment may be with his equals, his superiors, or his inferiors, where the terms are "used without stigma," as Veblen used to say, to denote the status as of that moment, whether economic, professional, or organizational. The salesman while making a sale is dealing with a superior; the professor in his classroom with inferiors.

This classification, according to status as of the moment, is of importance only when direct contacts are considered. All other cases fall into the earlier division of individual work. The instructor of a correspondence course and the copy men in an advertising agency are engaged in individual, not collective, work; and their tasks are mental routines enlivened perhaps by instants of creation. A university president faces in his board of trustees his superiors, in his faculty meeting his inferiors, and in exterior contacts, except when he scents a possible donor, he meets his equals.



F. S. Lincoln, '22

Air speeds continue to be increased. Last month Lieut. Col. Guglielmo Cassinelli flew 393.33 miles an hour over a 100-kilometer course in Italy, while in New York, A. P. De Seversky broke the world's speed record for amphibian planes by flying 177.79 miles an hour

Accepting the classification of work as (a) *individual*, including study, creation, mental or physical routines, and (b) *collective*, involving contacts with superiors, equals, or inferiors, it becomes possible to set down one's own desired ration of work. A time unit is necessary, for it is the proportion of the different forms of work in one's day that gives rise to feelings of opportunity or restraint, of satisfaction or futility. For convenience, a day is considered to be formed by ten units of time. For a ten-unit day, on the average, in the ideal condition and without reference to present position or duties, what would be one's proportioning of his work according to the classification of the following table?

Individual Work	*Time Units*
Study	
Creation	
Mental Routines	
Physical Routines	
Total	
Collective Work	
With Superiors	
With Equals	
With Inferiors	
Total	
Grand Total	10

The reply of the research scientist usually specifies three-quarters of the time in individual work, with at least a fifth of that spent in creative effort; and the balance almost equally divided between study and routine operations — the latter predominantly physical for the laboratory worker of manipulative tendencies but mental for the mathematical physicist. The creative and artistic types indicate diminished interest in study and more time on routines, since these permit the expression of their creative periods. In both cases the interesting point is their division of the remaining quarter of the time, for only fractions are assigned to contacts with superiors and inferiors. Most of their human contacts are desired in a give-and-take with equals.

Markedly different are the rations of the doers from those of thinkers and creative craftsmen. Sixty per cent or more of their time, by choice, is spent in collective work; and the balance divided about equally, in general, between mental and physical routines. For the salesman, the desired contacts are primarily with superiors, those who have the power if they can be persuaded to assent; and only slightly less with equals, for by nature he likes the company of his fellow man. The office manager emphasizes contacts with inferiors, as in fact do secondary school teachers and many others who like to instruct and direct.

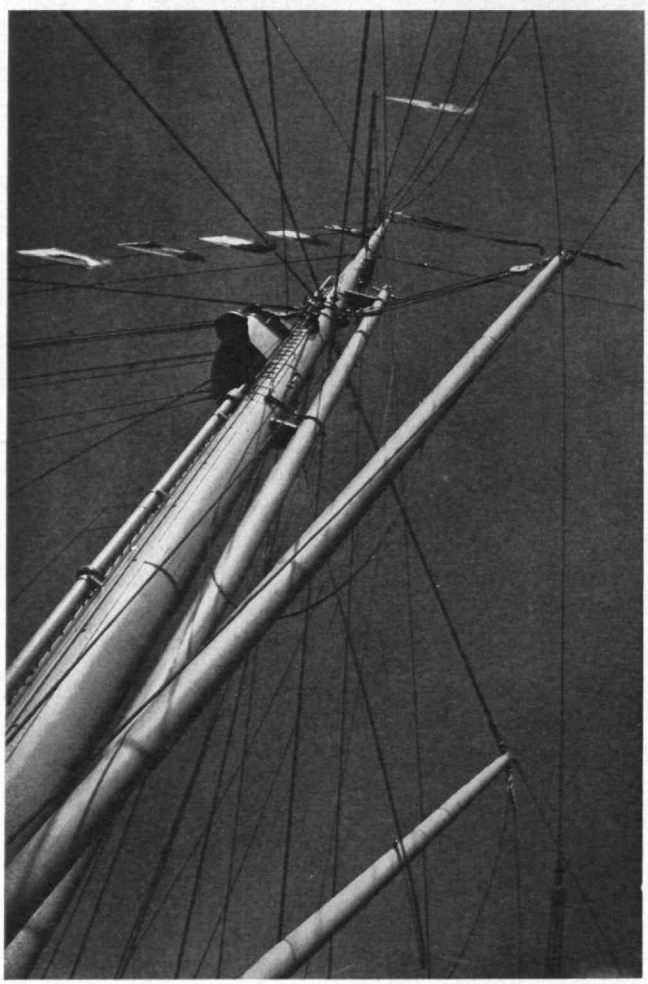
If inferiors are preferred, equals, of course, are next, as is true if superiors are preferred. One exception to this natural rule has been noticed — a capable and well-trained man, who occasionally would fail to hit it off in human relations with results of temporary stress. His expressed preferences were alike for inferiors and superiors but negligible for equals. In other words, given either situation, he conformed admirably, but in the absence of designated authority he might come a cropper.

From the standpoint of any employer, the problems are the division of work in the position to be filled, and what balanced ration will satisfy an applicant who is otherwise well qualified. Despite apparently perfect qualifications, if there is not similarity in the rations desired and afforded, he might resign on the first opportunity or, remaining, reconstruct his employer's organization — leaving to fellow workers duties he distasted and grasping at those which satisfied.

For those of us who rank as employees, contentment may follow analyses of ourselves and readjustments of our duties. Success in our careers will depend to a large extent upon a happy coincidence of similarity between the work ration available and that desired, or upon individual ability to shape our jobs to fit our temperamental requirements.

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It has been estimated that the amount of silt carried yearly by the Mississippi is in volume equivalent to a cubic mile; that its flow in flood time would fill Lake Erie in two weeks.



F. S. Lincoln,'22

Air Conditioning for Comfort and Health

BY JAMES HOLT

LAST February The Review presented a discussion of humidification in residences, and last November data on the methods, costs, and limitations of domestic air conditioning. Since improvements are constantly being made in the art of air conditioning, and since the



Rittase

The New York Academy of Medicine, at the request of the Mellon Institute, has begun a study of the health effects of the unseen chemical fog which overhangs American cities. Smoke abatement is already practiced in most large cities, but it is becoming necessary to consider other and possibly more harmful products of fuel combustion

subject has become so vital to everyone, it seems appropriate to outline in more detail the "philosophy of comfort" which underlies the development of the art.

The human body is a power plant and therefore requires fuel and air for its operation. The fuel supplies the combustible elements and the air the oxygen necessary for their burning. This power plant, like every other, must obey the second law of thermodynamics wherein part of the heat generated is converted into work, and the rest rejected at a lower temperature.

One function of air conditioning for comfort is to provide atmospheric conditions in closed spaces where people congregate so that this heat rejected from the human body will be carried off at the correct rate. Another function is to provide conditions which are healthful and pleasant, which involves supplying air free of odors, dust, bacteria, and toxic gases.

Heat is rejected from the body partly by radiation to surrounding objects which are colder, partly by conduction to the surface of the skin and clothing, and then by convection to the surrounding air, partly by evaporation of moisture from the surface of the skin and clothing to the surrounding air, and partly to the air we breathe which picks up heat and moisture from the lungs and membranes of the nose and throat. By far the greatest proportion is by radiation, conduction, and evaporation from the surface of the skin.

Under normal conditions, the body is maintained at a temperature of 98.6° F., hence the rate of heat production within the body and the rate of heat dissipation from the body must be balanced. In a healthy person the heat-regulating mechanism does this automatically within the range of its ability. This human mechanism regulates in two ways: (a) by regulating metabolism, i.e., the rate of internal heat production, and (b) by regulating cutaneous blood circulation and functioning of the sweat glands.

In warm environments, the regulating mechanism of the body decreases metabolism to some extent and increases blood flow to the surface of the skin to increase skin temperature and hence heat loss. The sweat glands also pass more water to the surface of the skin where it is evaporated, absorbing heat from the body as latent heat.

In cold environments, increase in the rate of metabolism takes place. The blood vessels contract and sink below the surface of the skin, thus lowering the skin temperature and increasing the insulating layer. The sweat glands exude less moisture and, consequently, decrease the amount of latent heat removed by evaporation. Shivering occurs whereby muscular energy creates heat energy to help warm the body.

For comfort and health, air conditions should be such that the heat-regulating mechanism of the body can perform its function with greatest ease.

We have said that heat was rejected from the body by radiation, by conduction and convection, and by evaporation. The rate of heat transfer by radiation depends upon a number of factors, but primarily upon the temperature of surrounding walls, glass, and furniture surfaces. The rate by conduction and convection

depends upon temperature and velocity of air flow over the surface of the body. The rate by evaporation depends upon the relative humidity of the surrounding air and the velocity of air flow over the surface of the body. It is evident from the above that the air temperature, humidity, air motion, and temperature of surrounding walls must be controlled to maintain comfortable conditions.

The American Society of Heating and Ventilating Engineers in its Research Laboratory at Pittsburgh, and the Harvard Research Laboratory of Public Health have conducted extended researches to determine the relations between temperatures, humidity, and air motion in rooms where the wall temperatures were approximately the same as the air temperature.

All conditions of temperature, humidity, and air motion which give the same degree of comfort have been termed "effective temperature" and the range of effective temperatures over which some people feel comfortable the "comfort zone." This zone is fairly broad, due to a number of factors, such as differences in clothing, stature, weight, and so on of the various people. The zone also shifts from winter to summer conditions due to changes in clothing, acclimatization, metabolism, and so on.

A number of modifying factors must be taken into consideration. In actual buildings the outside wall surfaces are several degrees below the room temperature, especially glass surfaces which may be as much as 40° or 50° below room temperature. This would increase the percentage heat loss from the body by radiation, especially in rooms having large percentages of glass and exterior wall. The effect of radiation on the comfort zone is being studied at the present time.

In buildings heated by the radiant, panel or floor heating systems, much in vogue in England and of which a few installations have been made in this country, the above comfort zones do not apply at all as portions of the ceiling or walls or floor are maintained at temperatures above body temperature, and heat is transferred to the body by radiation.

In stores, theatres, and other places of short time occupancy, effective temperatures as low as called for by the summer comfort zone cannot be maintained due to the shock people feel when passing from hot, humid air outside to the cool, dryer air inside.



C. E. Patch, '02

More than half a million people have witnessed demonstrations at the Technology exhibit at A Century of Progress, and more than a thousand alumni have registered there

While we can feel equally comfortable in very dry, warm air or very humid cooler air, it is considered desirable for health that the relative humidity be maintained between 30% and 70%. We are limited, however, in the relative humidity we can maintain in winter due to condensation on windows. With ordinary windows, condensation starts at approximately 18% relative humidity when the outside termperature is zero, at 30% when the outside temperature is 20° F., and 40% when the outside temperature is 32° F. With double windows, a relative humidity of about 50% could be maintained for all temperatures above zero.

The A. S. H. V. E. comfort chart is based on an air movement from 15 to 25 feet per minute. The position of the comfort zones is effected by changes of air motion. However, the change would not be far from the above as air movement in occupied spaces is usually limited to approximately 80 feet per minute, due to danger of drafts above this value.

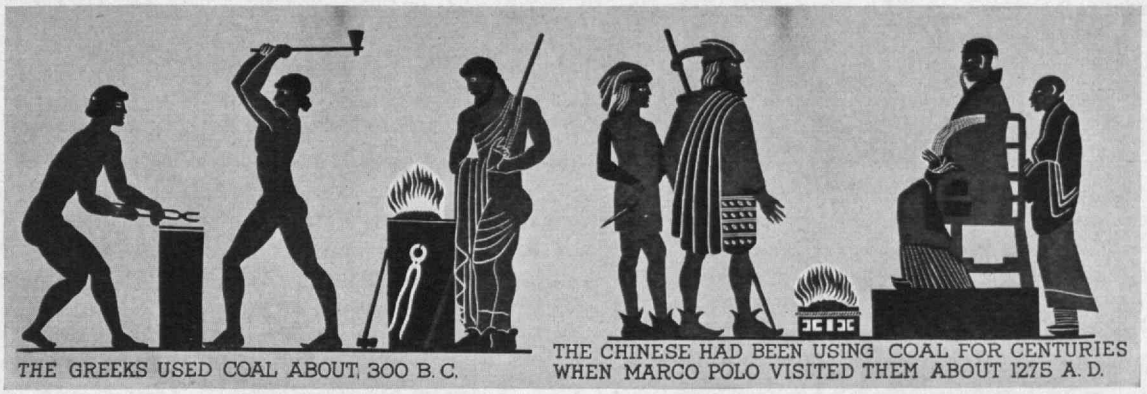
An important part of air conditioning is the control of atmospheric pollution. Some of the principal sources of pollution are emanations from the throat and lungs, including carbon dioxide, moisture, odors, dust fumes, smoke from chimneys, automobiles, and ordinary street dust. Bacteria also may be dust-borne or air-borne. Carbon dioxide, which was formerly considered injurious to health, is now considered harmless in ordinary concentrations.

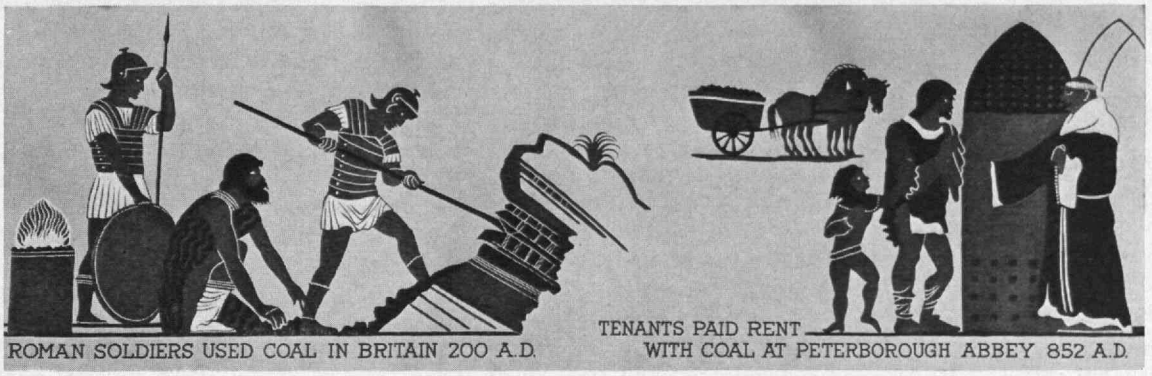
Dust-borne bacteria have been held responsible for the transmission of disease but this has not been supported by the medical profession, as the harmful bacteria found in the air constitute a very small proportion of the total. It is commonly believed, however, that disease is transmitted by actual contact and by particles of moisture from coughing and sneezing. These particles of moisture soon settle, however, and, from data collected by the late Professor Sedgwick, are effective within a radius of about eight feet of the offender.

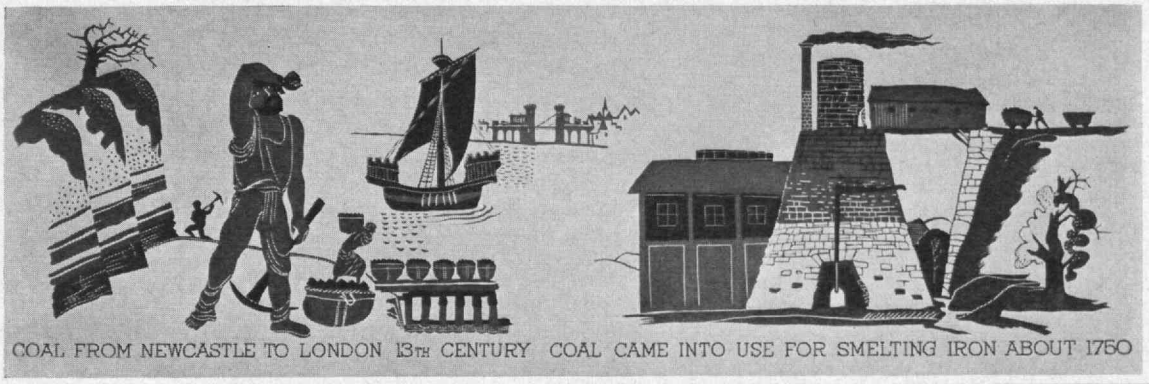
Probably the most important polluting elements are odors and dust. Odors can be controlled by a sufficient supply of fresh air from outside. In dwelling houses, there is usually sufficient infiltration of fresh air around windows, doors, and through open windows so that a fresh air supply is not necessary. Dust can be controlled by filters so arranged that not only fresh air but recirculated air is filtered before passing to the rooms. Filters are considered an essential part of the air conditioning equipment. Filtering the air supply has been found of special benefit to people suffering from hay fever.

Even though the air supply may be properly conditioned as above, there seems to be something lacking in the "feel" of air in closed spaces, and the public health profession is searching for the missing link. It is thought that this may be ionic content. Studies are being carried on at present, but to date no conclusive proof has been established.

The ultimate aim of the air-conditioning engineer is to reproduce indoor conditions comparable with an exhilarating spring day in the open country.









The Story of Coal

These charts portraying the industrial history of coal are exhibited by the Museum of Science and Industry, Chicago. This great technical museum is indicative of widespread recognition in America of the value of such institutions. The Museum of Science and Industry in New York has made a vigorous start, the Franklin Institute in Philadelphia is developing a splendid exhibit, and in Dearborn, Henry Ford has assembled a most instructive collection.

THE INSTITUTE GAZETTE

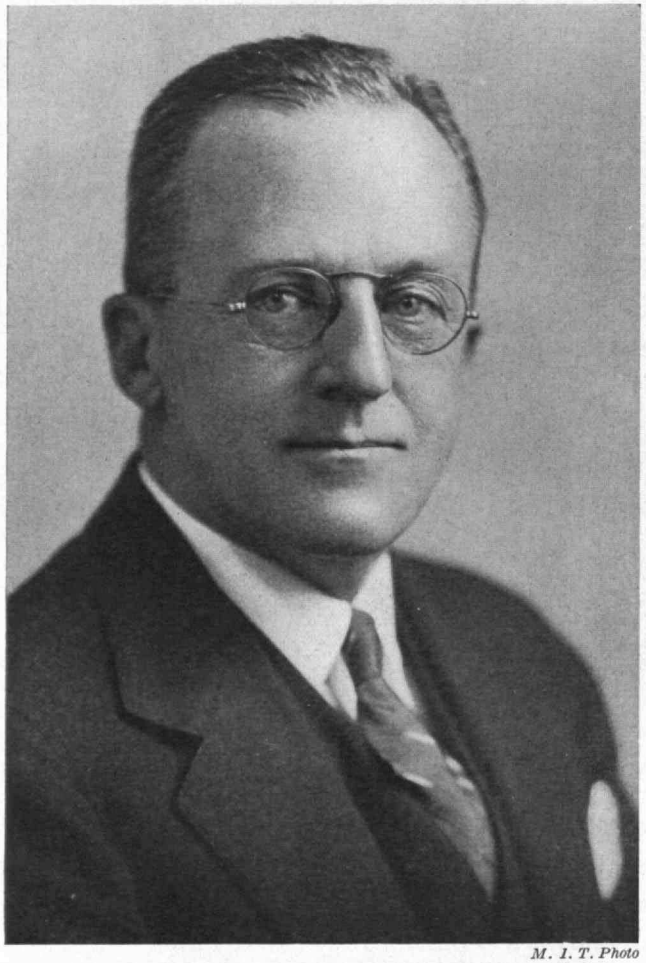
PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

EDITORIAL NOTE. *For the convenience of our readers, all news of the Institute (except formal articles) is now combined in this one department. Consequently all material prepared by Mr. J. J. Rowlands, Director of the Technology News Service, which formerly appeared under the heading "M. I. T. News Bulletin," henceforth will be found here along with the usual contents of "The Institute Gazette," presented, it is hoped, with added emphasis and attractiveness, and complemented with pertinent illustration.*

Financially Speaking

By H. S. FORD

THE Annual Report of the Treasurer of the Institute, Everett Morss, '85, presented to the Corporation at its meeting last month, is not generally included in the list of best sellers. There is little opportunity for the development of romance or thrill in its pages although a member of the Faculty once remarked that it ranked with the best fiction of the summer.



M. I. T. Photo

Bursar Horace S. Ford, author of the accompanying analysis of the Institute's financial situation. Coming to the Institute in 1914, he has rendered 20 years' distinguished service to Technology

If, in other years, the number of really interested readers has been a doubtful quantity, it is possible to say this year that exactly 1,027 people were vitally concerned both with the preparation and contents of this report. These 1,027 were at that time the number of persons regularly employed by the Institute in all capacities during the past year. By their participation in the Salaries Reserve Plan, under which a percentage of their salary was withheld to meet possible contingencies, they all had a personal interest in the economies that were effected, with the rather agreeable results which the report records. It was only necessary to continue this plan over a period of five months, at the end of which it was evident that further deductions would not be needed. And, better still, it was possible to return the total amounts so deducted on July 1, so the real result of the plan was that everyone had a little more money saved up at the end of the year than they might have had otherwise.

The Salaries Reserve Plan worked so well that it is again in force this year and whatever the result — whether the "dividend return" is 100% or less — the coöperation of everyone in the plan may be counted upon without question and their continued operating economies and interest in the Treasurer's accounts assured.

As might be expected, the Report indicates that capital gifts fell off rather badly last year. The total received was $175,000. You must go back to 1911 to get below this figure for any single year. The average annual receipts in the form of capital gifts in the past 20 years have been in excess of a million and a half. It will be interesting to see what the next decade does to this average.

The Report next includes the statement of Mr. Hayden's ('90) committee in charge of the Technology Loan Fund. Digested, it shows that the total receipts from contributions and earned income have been $1,186,812.50. The total amount requisitioned by the Technology Loan Board during the past three years for student loans is $417,027.93. This leaves a balance in the Committee's hands of $769,784.57. On this amount the Loan Board expects to requisition this year approximately $180,000. With repayments of principal and interest now beginning to return in substantial amounts, these annual requisitions on the Committee's Fund should diminish considerably.

The Technology Loan Board has actually loaned to students a total of $436,525 — some $19,500 in excess of the amount requisitioned of the Committee, meeting this excess by repayments of principal and interest by student borrowers.

It should be noted that for the first time the Student Notes Receivable are set up on the Treasurer's balance sheet and a special schedule showing the operation for the year of all loan funds is included in the Report.

The total amount of student loans repaid last year for all funds was $24,674.04. The total amount of interest paid was $5,892.43. If repayments of principal and interest to this extent can be secured in a year in which financial conditions are as difficult as last year, it augurs well for the possibility of making our loan funds truly revolving with improving business.

The statement of the Trustees of the M. I. T. Pension Association is of particular interest to its participating members, 320 officers and members of the Staff. The Pension Plan was put into effect in October, 1926, and has built up assets since that time in excess of $705,700. Of this $392,100 belongs to the participating members, representing 5% salary deductions and accumulated interest; $292,100 represents the contributions of the Institute and interest during the time; and $21,500 a special reserve set up for the payment of annuities to retired members. For the past year there have been six annuitants, but beginning July 1, 1934, this number will increase to 14.

The Association was formed under the laws of the Commonwealth. The regulations do not permit the Trustees to pool their holdings with the general investments of the Institute — which would be highly desirable from the Institute's point of view and that of the participating members. The list of investments includes 29 issues of bonds and a single stock holding — total book value $639,376.75. There were no interest defaults from these securities during the year and the market value as of June 30 was in excess of $585,000. This shows marked improvement over the conditions six months previous and there has been a betterment since this statement was published.

The main body of the Treasurer's Report contains four major schedules: (A) *Financial Result of Operation*, (B) *Operating Income*, (C) *Operating Expense*, (D) *Treasurer's Balance Sheet*. All other schedules are in support of the above.

A. *Financial Result of Operation.* Gross expense exceeded gross income by $39,327.37, but charges against special funds absorbed all but $5,727.40 of this, and the latter amount is the actual increase of the Institute's cumulative deficit (since 1865) which now stands at $35,426.95.

B. *Operating Income.* Gross income dropped $431,000 (11%) to $3,289,000. The net income dropped $250,000 (8.2%) to $2,780,000. The income from students fell off $114,000 (7.2%) as a result of a reduced student body — from 3,188 to 2,831. Gross income from investments shows a falling-off from the previous year of $221,000, or 13.2%, to $1,446,211, but net income from investments dropped but $7,500, or 0.6%, to $1,230,800. This is because the very considerable additional income that was available under the Eastman Contract was almost sufficient to offset the large loss resulting from the discontinuance of dividends on 39 issues of stock (24,356 shares) and the default of interest for the whole or part of the year on nine bond issues ($862,000 par value). Income from all other sources fell off $129,000, or 64%.

C. *Operating Expense.* By complete coöperation on the part of all persons in the Institute's employ (Salaries Reserve Plan), expenses were cut to meet this reduced income, obviously with some curtailment in the useful activities of the Institute as well as in the maintenance of the plant and its facilities. But, as the Treasurer points out, "all necessary repairs have been made and the plant and facilities are in good condition."



Happily enough the registration figures forecast in the last Review were low. While final returns are not available until November 1, it is possible to say that the final registration is closer to 2,600 than the anticipated 2,400

Academic expenses fell off $180,000, or 8.8%, to $1,859,115, largely by reduction in the number on the teaching staff and because of savings in the departmental expense accounts. Administration expenses dropped $19,000, or 6%, to $313,700; plant operation dropped $54,000, or 14.4%, to $323,729; and miscellaneous expenses decreased $12,000, or 4%, to a figure of $288,000.

D. *Treasurer's Balance Sheet.* The statement of the Institute's assets and liabilities is but little changed from that of last year except for the exhibit, for the first time, of the student notes receivable and loan capital.

The Endowment Funds show an increase of $80,000 and now total $32,731,230. There are now 209 of these funds and they are protected by a reserve of $492,000 built up by gains on sales and maturities. This reserve also absorbs losses taken on the sales of such items and the annual write-off on account of the amortization of bonds bought at a premium.

With eight exceptions, all of these endowment funds are invested in a single group. This pool includes 494 separate security items as shown in detail in the Report, 391 bond issues and 103 of stock, totaling $32,323,000. The market value of these items on June 30 was $26,500,000, or 82%, of book. There has been improvement in this ratio since that date.

The income received from these investments produced a net yield for the year to these funds of 4.44%. This compares with 4.65% for the previous year.

Current Liabilities total $284,000, of which $208,000 is represented by 106 Minor Fund balances (shown in detail in the Report) and generally expendable for specific purposes during the coming year.

Educational plant capital, $15,703,258.55, shows little change over the previous year and the total of assets and liabilities, $49,181,137.81, differs substantially from last year only by the inclusion for the first time of the student loan items previously referred to.

The Report concludes with a digested statement regarding each endowment fund, showing dates received, donors, and the purposes for which they were established.

A Few Comments. It is interesting to note that of $1,425,000 received from students for fees during the year, $335,950, or 23%, was provided by Undergraduate

Scholarships, Graduate Scholarships, or Student Loans — a much larger proportion than has obtained in any past year.

Income from late registration fees — the famous $5 fines which loom so large on the student horizon — was reduced to $1,315. This will give some comfort to incoming students as apparently their chances of avoiding a fine for the coming year are better than 20 to 1.

Income from Condition Examination Fees also dropped considerably to $6,110. Students may similarly figure their chances as better than 12 to 1.

The question of the amount of income received as a result of dormitory operation has come up frequently in past years. The total net income of $38,615.72 represents slightly less than 3% yield on the total amount of capital invested — one and a half per cent less than the general investments produced.

The Institute received no aid from State or Nation except a portion of the amount allotted the State under Federal Land Grant Acts. This amounted to $22,255 last year or something less than 1% of the total income received.

The cost of operating the Power Plant was reduced $11,500 over 1931–1932, or more than 11%. At the present time the plant is being converted from coal burning to oil and the cost of such conversion is expected to be met in three years. In addition to this, a further saving over the past year's operation is expected.

Despite difficult operating conditions, the Dining Service was able to meet all costs except that of occupancy, assessed against it for the past few years. During the year there were 440 special luncheons, dinners, meetings, dances, and other functions which the Dining Service took care of in addition to its regular services. As further evidence of the back-to-Walker movement, there were on September 15, 255 similar functions scheduled for the current year.

The Report indicates that the academic work of the Institute has been carried on without undue hampering for lack of funds, without dipping into unrestricted funds which are available in great need, and with reasonable support for many research projects already begun in various fields. The operation for the year ran remarkably close to the budget as revised and adopted about October 1, 1932. It is to be hoped we shall be as fortunate during the year just begun.

Graduate Housewarming

THE opening of the Institute's first graduate house, a project in which President Compton has been much interested, was marked by a housewarming on Saturday evening, October 7, when the President and Mrs. Compton, Dr. Avery Ashdown, '24, House Master, and the student executive committee were hosts to a large gathering.

The guests included Vice-President Bush and Mrs. Bush, Dr. Harry M. Goodwin, '90, Dean of the School of Science, and Mrs. Goodwin; members of the Corporation; members of the Faculty Committee on the Graduate School and their wives; various administrative officers, and the students who now reside in the new house, as well as those who are on the waiting list.

The new house, which with the possible exception of a similar project at Princeton University is unique among engineering schools, is expected to increase the broadening cultural benefits of a closer social relationship between graduate students in the various professional fields. The success of the new house plan is indicated by the fact that, although it has a capacity group of 77 students, there is a long waiting list.

The new house is composed of the former undergraduate dormitory units of Crafts, Nichols, and Holman. The master's apartment includes an attractive living room with provisions for entertaining and for committee meetings, and a private study overlooking the Charles River. The building also contains a well-equipped kitchen and a ladies' retiring room.

The large and comfortable living room of the new house has been named for a former President of the Institute, Dr. James Mason Crafts, whose portrait hangs above the fireplace. The walls of the room are finished in a restful shade of pale green, and the furniture is done in red and green fabrics. Across the entrance hall from the living room is the Crafts Library, a room with red leather lounges and club chairs and numerous well-designed reading lamps. A fireplace adds to the comfortable atmosphere of this room.

Particular care has been taken in the selection of volumes for the library (for which an anonymous gift of $1,000 has been made). These come within five categories, which include those of general cultural interest, general fields of science, the leading handbooks of physics, chemistry, and engineering, histories of the various phases of science, and biographies of the scientists. There will also be a large selection of periodicals.

Howard A. Robinson, '30, of Schenectady, N. Y., is chairman of the library committee, and the graduate students will have at their disposal more than 1,500 volumes. Robert K. Mueller, '32, of Waterbury, Conn., is chairman of the house committee on music, and has already formed a quintet of musicians.

Assisting Dr. Avery Ashdown in administration of the house is a student executive committee composed of Richard L. Fossett, Jr., '33, Albany, N. Y., who is also chairman of the interdormitory relations committee; David B. Langmuir, G., Englewood, N. J., who is in charge of the arrangements for the weekly dinners at which prominent guest speakers will address the students; and Henry A. Rahmel, '33, Chicago, who is chairman of the maintenance committee of the house.

President Compton was guest speaker at the first of the graduate dinners, held on October 11.

The house residents represent 11 branches of scientific and engineering study, including civil, electrical, mechanical, chemical, mining, and aeronautical engineering, chemistry, biology and public health, physics, geology, and business and engineering administration.

Scholarship in the Lean Years

THE Dean's List of Undergraduate Students of High Scholastic Standing, just issued by the Institute, shows that the "lean years" are more productive of high scholarship and intellectual wealth than the proverbial "years of plenty." The percentage of students who attained the honor of appearing on the Dean's list for the

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In the metal working plants it is the grinding wheel—millions of wheels in thousands of combinations of size, abrasive bond and structure.

Abrasives in grain form polish steels, brass, bronze and a dozen other alloys.

Thousands of artisans keep keen edge tools keen with India Oilstones.

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IN MODERN TOOL ROOMS

Norton Abrasives Are Used In Two Great Tool Wheels

The Long-famous "Red Wheel"

Some years ago Norton Company developed No. 38 Alundum abrasive—the first of three important contributions to better tool grinding. The cool, free cutting action of this new abrasive proved ideal for the high speed steels and alloys then coming into general use in tool rooms. Characterized by its distinctive red color, the Norton No. 38 Alundum Wheel immediately became a favorite with tool room men—is still the popular choice of many.









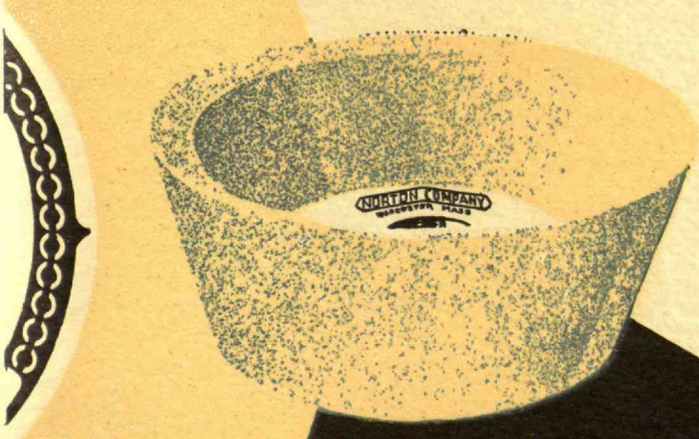
The New "B" Bond "White Wheel"

Next came "B" bond—the second important Norton contribution to tool grinding; and then Controlled Structure—the third contribution.

"B" bond is an entirely new type of vitrified bond that eliminates certain undesirable and uncontrollable features found in ordinary vitrified bonds. Controlled Structure means that the actual spacing of the grains in a wheel is now accurately regulated and varied. You can get a Norton wheel that has not only the right grain and grade for the job but also the right *structure*—grain spacing.

It is no wonder that the Norton "White Wheel"—combining as it does the features of No. 38 Alundum abrasive, "B" Bond and Controlled Structure—is being proclaimed by tool room men everywhere as the best they have ever used. They like its fast, cool cutting action with no tendency to burn—even on the hardest high speed steels and alloys. They like the way it holds its shape—the few dressings that are required.

If you are not already using the Norton "White Wheel" be sure to try it on your tool room jobs.



NORTON COMPANY
Worcester, Mass.

NORTON
GRINDING WHEELS

ABRASIVE PAPER

NORTON ABRASIVES

In every industry where "sandpaper" is extensively used mechanics have seen the quality improvement with the development of modern abrasives.

Quality is measured by speed of cutting and length of service.

The tremendous success of Norton Abrasives in the "sandpaper" industry is due not merely to "happenstance" but to exhaustive experimentation, engineering research and scientific development of an ideal abrasive grain for the industry—correct in shape, degree of hardness, toughness and sharpness, with a special surface for bonding with glue.

Abrasive paper and cloth—sheets, discs and rolls—coated with Norton Abrasives are made and marketed by Behr-Manning Corporation, Troy, New York.



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The hard tool steels and alloys call for more attention to sharpening stones—more need than ever for Norton Abrasives.

There is no steel too hard for the Norton Pike India Oilstone.

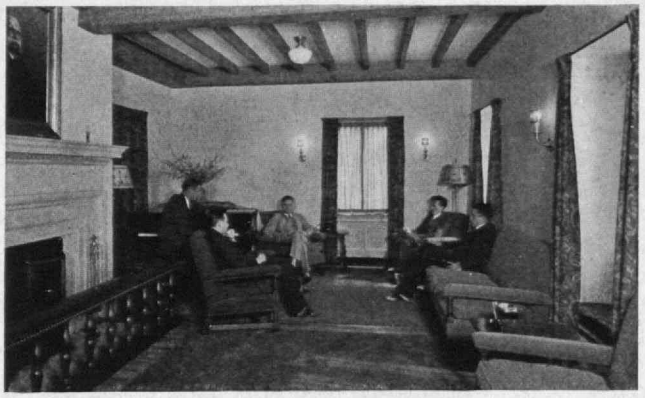
And now comes the "powered" oilstone—operated from any electric light socket. Designed to put an oilstone finish on such cutting tools as taps, cutter heads, clicking dies, hollow mills, forming tools and lathe tools.

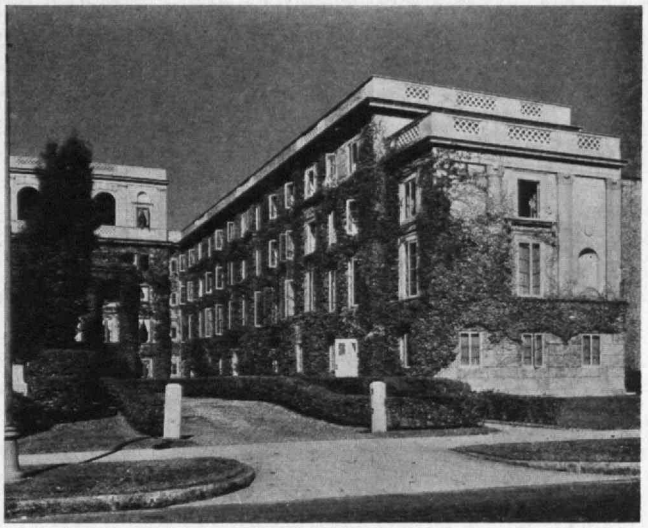
A power bench stone handles tools with broad flat edges like chisels, plane irons, box and bearing scrapers, moulder knives and machinists' scrapers.

Inquiries for these oilstone products should be made of Behr-Manning Corporation, Troy, New York, sales representatives for Norton Pike Company.

INDIA OIL STONES

NORTON ABRASIVES





Right: *Technology's graduate house* (see p. 64), *wherein reside 77 graduate students and at the doors of which many more clamor for accommodations.* **Above:** *House Master Avery A. Ashdown, '24 (facing directly forward), talking with residents in one of the pleasant lounge rooms*

last term is the largest in the Institute's history, and the scholastic average of the entire student body attained a new high record.

The list, which covers undergraduates of the first, second, and third years only, names 553 students, which is 34% of the group. The standing of these students is due not only to excellence in their professional studies, but also to their interest and scholarship in literature, economics, and allied cultural subjects which are part of their professional training at Technology.

It is significant that the records of Technology and other educational institutions show unmistakably that, as a whole, those classes which were graduated during or soon after business depressions have been outstandingly successful. The leading part that technically trained men are playing in President Roosevelt's program for recovery is also seen as a stimulation for high scholarship. Engineers and industrial executives, including many of Technology's most distinguished graduates, are now engaged in the solution of fundamental economic, political, and social problems. Their contributions are recognized as further evidence of the importance of the engineer whose knowledge, training, and insight qualify him to administer the affairs of modern civilization.

Deanery

PROFESSOR Charles E. Fuller, '92, ordnance expert and veteran of 41 years' teaching in the Department of Mechanical Engineering, recently was appointed Dean of Army Students at Technology. He succeeds an old friend, the late Professor Edward F. Miller, '86, who held the position from 1921 until his death last June.

During his long affiliation with the Institute as undergraduate and teacher, Professor Fuller has gained the warm regard of hundreds of students and alumni. Appointed to the mechanical engineering staff soon after his graduation, he became Assistant Professor in 1900, and six years later, Associate Professor. Prior to his promotion in 1912 to Professor of Theoretical and Applied Mechanics, he was for 18 years in charge of instruction in the Laboratory of Testing Materials.

Recently he has served as chairman of the committee in charge of graduate courses in his department, and as a member of the Committee on the Graduate School.

Professor Fuller has long been keenly interested in the design and construction of ordnance, and has devoted part of his time at the Institute to instruction in ordnance engineering. In 1923 he was commissioned Lieutenant Colonel in the Ordnance Department of the Officers Reserve Corps, U. S. A. He is also a member of the Reserve Officers Association of the United States, and the Boston Post of the Army Ordnance Association.

Eminent Mathematician

PROFESSOR Otto Szász of the University of Frankfurt recently arrived from Germany to assume his duties as Visiting Professor of Mathematics at the Institute. During the winter he will lecture on the summation of series, one of the branches of mathematical analysis in which he has gained an international reputation.

A native of Hungary, Professor Szász is a former student of Professor Leopold Féjér, one of the founders of Hungary's important modern school of mathematics. Partly as a result of extraordinary stress laid on mathematical study in recent years by the Hungarian government and universities, this small group of scholars has come to be regarded as one of the most brilliant in the world. For his achievements in analysis, Professor Szász was recently singled out to receive one of Hungary's highest mathematical prizes. He has been a member of the mathematics staff at the University of Frankfurt since the school's foundation soon after the World War. Prior to that time he served as instructor at the University of Göttingen.

For many years he and Dr. Norbert Wiener (see page 47) have worked in close touch, and the two plan to coöperate on various analytical problems during his stay at the Institute. His presence will contribute further to the great reputation for brilliant work which Institute mathematicians are acquiring.

Leaves of Absence

LEAVE of absence from the Institute for all or part of the present year has been granted Professors Allyne L. Merrill, '85, Secretary of the Faculty and

member of the departmental staff in Mechanical Engineering; Harold C. Weber, '18, Department of Chemical Engineering; Charles H. Porter, '02, Department of Business and Engineering Administration; and Carroll W. Doten of the Department of Economics.

In Zurich, Switzerland, Professor Weber is now carrying on advanced studies at the Technische Hochschule, under the direction of Professors Scherrer and Guyer. During his year's stay abroad, he plans also to engage in technical writing and research.

Professor Porter, who has been granted leave for the second term, expects to spend next spring in Geneva, where he will study European methods of accounting and industrial control in connection with the International Management Institute.

Professor Merrill, for many years a member of the Institute staff, has been given sabbatical leave for the second term. Professor Doten will be absent for the entire year.

Going South

THE Institute will coöperate with the second Byrd Antarctic expedition, which is expected to establish its base on the Antarctic ice this winter, by maintaining radio communication over the 9,000-mile airway between Rear-Admiral Byrd's headquarters and Cambridge.

Special shortwave equipment is being assembled and the Technology station will maintain a daily schedule for transmission of personal communications from members of the expedition. The station will have quarters in the meteorology division of the Guggenheim Aeronautical Laboratory and, in addition to expedition business, daily weather reports will be received for the benefit of the meteorological staff.

Experiments in transmission on a wavelength of 10 meters will be attempted when the expedition establishes its base. Most of the communication will be carried on the amateur wave bands. The expedition, however, has been authorized to operate on other channels when amateur radio traffic interferes. The Institute's station will be operated by Ethan A. Murphy and Frank A. Arsenault.

Three Technology men have been selected for positions on Admiral Byrd's staff. John N. Dyer, '31, of Haverhill, will be in charge of radio communications for the expedition, while Russell S. Robinson, '32, will be first mate on one of the ships. He is a native of New Zealand and has specialized in aeronautical engineering. Dr. Ervin H. Bramhall, a research associate in the Department of Physics, is to be a member of the scientific staff. He accompanied Dr. Ralph C. Bennett of the Department of Electrical Engineering on the cosmic ray survey in Alaska last year. Dr. Bramhall is a graduate of Stanford University and in addition to his work at the Institute has carried on advanced research in England, where he was awarded his doctorate at Cambridge University in 1929.

Placement Officer

JOHN M. NALLE, '20, has been appointed to the position of Placement Officer in the Division of Industrial Coöperation, of which Professor Charles L. Norton, '93, is Director. His appointment is a reflection of renewed activity in industry and a growing demand for technically trained men.

Mr. Nalle, who had been on temporary appointment for several months, is a native of Virginia and a graduate of the University of Virginia in the class of 1919. The following year he came to the Institute for advanced courses and was awarded the degree of master of science in electrical engineering. He then became assistant to the electrical engineer of the Panama Canal, and later came to Boston to make a study of electrical rates for the city government. This was followed by special engineering investigations for the Metropolitan District Water Commission of Boston and for Malden.

In 1926 Mr. Nalle joined the staff of the American Chain Company in Bridgeport and three years later entered the engineering department of the Technicolor Motion Picture Corporation.

Investigators, Examiners, Experimenters

ON March 3, 1869, President Lincoln signed a document creating a new group "to advance Science . . . to investigate, examine, and report whenever called upon by any department of the Government of the United States." This society, called the National Academy of Sciences, now grown to be one of the most distinguished scientific bodies in the world, will hold its autumn meeting at the Institute from November 20–22. President Compton will make the address of welcome to the members, and the response for the Academy will be made by its President, Dr. W. W. Campbell.

The scientific sessions of the meeting are to be held in the Eastman lecture room in the new physics and chemistry building. On Tuesday, November 21, the members and their guests will attend a dinner at Harvard.

The outstanding public event of the meeting will be a lecture by Dr. Arthur E. Morgan, Director of the Tennessee Valley Authority, on "Muscle Shoals and the Tennessee Valley Problem."

President and Mrs. Compton will hold a reception for members of the Academy at their home on the evening of the opening day of the sessions. During the meeting members will have an opportunity to inspect the buildings and laboratories of Technology and Harvard.

Miscellanea

IF THE Institute maintained a Day Book, the following additional items might have been inscribed therein during the past month:

¶ President Compton spoke before a meeting of the Society of Automotive Engineers in Detroit, October 9.

¶ Conversion of the Institute's power plant from coal to oil is progressing.

¶ Dean Harold E. Lobdell, '17, who this year was elected President of the National Association of Deans of Men, attended in Chicago a meeting of the Executive Committee of the Association and the session of the National Interfraternity Conference.

¶ Changes which add greatly to the appearance of the Institute grounds have been completed. The parking space has been redesigned, new roadways and sidewalks have been built, and grass has been sown between the main buildings and Walker.

Corporation Visiting and Advisory Committee Reports

FOR the various departments and divisions of the Institute, the Corporation appoints Visiting Committees made up from its own membership. Periodically, these Visiting Committees meet with representatives of the departments and subsequently report to the Corporation. Supplementing these Visiting Committees, there is also a group of Advisory Committees, composed of leaders from the various fields for which the departments at the Institute train students. These Advisory Committees sometimes meet jointly with the visiting committees to discuss educational and industrial needs. The Corporation, wishing to publish and emphasize the discussions and transactions of both Visiting and Advisory Committees, has asked that they be presented in The Review. Many have been published in the past and to these are now added two more, presented in condensed form below, covering (1) the Department of Mathematics, and (2) the Department of English and History.

REPORT OF THE VISITING COMMITTEE OF THE DEPARTMENT OF MATHEMATICS*

". . . It is worth noting that in the past few years the Department of Mathematics of the Institute has changed from a department especially strong in teachers to one in which, in addition to the work in instruction, some of the most important mathematical research in America is accomplished. Four or five of the younger men in the Department rank among the 25 leading mathematicians of the country. Except perhaps in number theory, all the principal fields of mathematics are covered in the research and graduate work.

"In view of the increasing importance of the research work by members of the department, it appears very desirable to maintain, without appreciable curtailment in size, the *Journal of Mathematics and Physics*, which has been published by the Institute for 11 years. It contains less than one-half of the contributions of members of the department, but it provides efficient publication, particularly for those investigations that would not readily find place in journals of pure mathematics or journals devoted specifically to engineering."

The Committee notes "that there is no special fellowship for undergraduate or graduate students in mathematics, and in happier times the Committee would strongly recommend the founding of a fellowship, or, possibly better, of a research associateship.

"The new degree of Bachelor of Science in Mathematics is providing a highly competent training for young mathematicians, probably unexcelled in American institutions. This course of study, the maintenance of the *Journal of Mathematics and Physics*, and the commendable activity of the members of the Department are important factors in making Cambridge the most inspiring mathematical center of America."

*The Visiting Committee of this Department consists of: Francis J. Chesterman, '05; M. Herbert Eisenhart, '07; Henry E. Worcester, '97; and Harlow Shapley, *Chairman*.

JOINT REPORT OF THE VISITING AND ADVISORY COMMITTEES OF THE DEPARTMENTS OF ENGLISH AND HISTORY*

"Although students admitted to the first year of the Institute are, as a rule, well trained in writing — particularly when they come from preparatory schools of high standing — there is always a number of men in each class with whom this is not the case. Either from inherent difficulties with language, or by reason of inadequate training, or on account of unfavorable environment (boys who at home do not hear English correctly spoken), or because they are foreigners with little command of English, a substantial proportion of these are below the ordinary level. While such students are given special attention in order that they may overcome their difficulties in the use of spoken and written English, the eradication of their early habits and their attitude of indifference is necessarily a matter of time. Not infrequently they find themselves unable to carry the program of the first year as a whole and drop out. As proficiency in English is required of our graduates in active life, it would seem reasonable to scrutinize carefully in this respect all applicants for admission and, in cases of those suffering from handicaps, to discourage them from entering before they are ready.

"In the first year one-eighth of the time is allotted to the department; in the second year, one-sixth. The fundamental scientific subjects of those years tend so to absorb the interest of the student that he is likely to fail to realize the necessity of mastering the language with which he must do his work. The only way by which the importance of English can be brought home to him is good teaching. Your Committee is pleased to report that this necessity has been recognized by the President and Executive Committee and that the staff is provided with a head and force that have the necessary requirements. The staff of the department should, therefore, continue to be maintained with men who have enthusiasm for their work, who have an interest in students as human beings, and who possess the skill to awaken in them a desire to develop themselves to read with enjoyment and understanding and to express themselves effectively. If the teachers are real men with a spirit of leadership, the students will look upon English as a real subject.

"The need of training men in the upper years in the writing and presentation of technical papers is a subject that is receiving increasing attention. Impressed with its importance, the late President Stratton established prizes for the best papers presented by students before the undergraduate professional societies. The final competition for the prizes is now held on the day preceding the graduation exercises and is a dignified occasion which arouses considerable interest.

"In the formal training in this very practical use of English, in which stress must be laid not only on accuracy of statement but also on form, there are three methods which are now being used.

*The Visiting Committee which made the above report consisted of: W. Cameron Forbes, *Chairman;* Arthur D. Little, '85; Francis J. Chesterman, '05; and Payson Smith. The Advisory Committee members who met with the Visiting Committee included: General W. D. Connor, General R. I. Rees, W. K. Richardson, Matt B. Jones.

"(1) In some of the science departments, seminars or colloquia have for a good many years past provided this double criticism of substance and of form. The Department of Chemical Engineering also has a long established and well-organized system for training in reports, which is conducted by members of its own staff. Obviously, the success of this method depends upon the degree of interest which teachers of professional subjects take in matters of expression. As would be expected, this varies directly in proportion with the emphasis laid upon it by the teacher conducting the subject.

"(2) Instruction in report writing may be entrusted to men in the Department of English who have special aptitude and experience for it. This plan works well with students in the Course in Business and Engineering Administration, for the subject matter of their reports can be fairly general in character.

"(3) A third method which your Committee recommends highly is employed in the course in Committee Reports [subject G47], in which students give an oral presentation of technical subjects, followed by discussion. Here a representative of the professional department arranges the program and criticizes the work on the score of technical accuracy; the English instructor trains the men in delivery and criticizes procedure and expression. This helpful coöperation in instruction, besides giving the student the benefit of two points of view on his work, has the further advantage of convincing him that the professional departments stand strongly for the use of clear and correct English.

"While the development of courses in the upper years to give training in the practical use of English is perhaps the problem of immediate importance, your Committee wishes again to express the opinion set forth in former reports, that an essential work of the Department is to cultivate breadth of interest in the student by showing him how to read good literature with enjoyment. This can never be done by routine methods of instruction; as has already been remarked, the continuance of a staff of alert and inspiring teachers is necessary.

"The training of men for leadership in science, engineering, architecture, and industry is the main business of the Institute of Technology. To qualify for such leadership its graduates must possess as an ordinary working tool a command of English. General Rees, in his remarks to the Committee, laid stress upon the fact that nearly 50% of the work of the young engineers in the Bell System of the American Telephone and Telegraph Company involves the use of English, written or spoken. This proportion would doubtless hold good in many other cases. Unquestionably, if your graduates are to take a high position in the world of affairs, they must have a well-rounded training in English.

"Your Committee feels that the importance of the proper use of English and a mastery of it for both oral and written purposes by professional men is such that, in all departments of the Institute, and especially in the purely scientific, engineering, and architectural courses, emphasis should be constantly laid upon it. Both students and instructors should have it constantly before them. Papers, whether theses or reports, in 'sloppy' or ill-constructed English, should be refused no matter how excellent from a technical point of view. While prizes for excellence are admirable, they do not cover the whole ground. There should be penalties for deficiency. Your Committee renews its recommendation that in the choice of instructors and professors the definite policy of the Institute should be that only those proficient in English themselves and impressed with the necessity of it for their students should be given places on the Institute staff."

TRAINING FOR LEADERSHIP

(*Continued from page 51*)

our unimaginative way of demanding facts and ignoring ideas. With repetitive mutterings, the student learns that the Battle of Hastings was in 1066. His imagination is seldom stimulated to the point where he begins to wonder what the effect of the Norman conquest was on the structure of the English language. He learns that the value of gravity at sea-level is 32.2 feet per second and slightly lower atop Pike's Peak. It does not occur to him that the magnitude is of an entirely different order on the moon, and something else again half-way to the sun — this because the instructor has been more interested in conveying facts by which an examination can be passed than in stimulating that intellectual vigor which spells the difference between the leader's ability to interpret his information and the second rater's unimaginative copying.

The leader of tomorrow is not going to live in the world of today. It is, therefore, not for us to make him accept our textbooks as a be-all and an end-all. Our task is to prepare him to gather and to interpret evidence so that he can go on beyond the last pages of those books into an unknown world of television, internationalism, and unheard-of leisure. To do this he must have courage and he must have imagination. Training for leadership begs for less fact-swallowing nourishment and more exercise in creative or interpretative thinking.

Our greatest failure probably lies in not giving emotional stability to a larger number of our potential leaders. With the passage of the years, all children attain chronological maturity; some of them achieve mental maturity; only a few ever acquire emotional maturity. This is, I suspect, largely due to contact with parents who belong to the shamefully large group suffering from suspended adolescence. Truly the iniquities of the fathers are visited upon the children of the third and fourth generation. Bringing up children is not properly an affair for the immature, but a task for grown-ups who have disciplined themselves.

Emotional maturity is more than a mere schooling of the passions; it goes beyond mere conformity to the conventions of good manners. It is self-control based on an understanding of the fundamentals of human relationships. It is, therefore, not concerned with proving the other fellow wrong, but with setting the situation right. People are no more mature than the things they fight over.

THE last of the qualities suggested as essential for one who would develop skill in handling men is a sense of justice. Everyone (*Continued on page 74*)

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PUTTING MATTER TO WORK

(*Continued from page 49*)

about one kilowatt hour. The ratio is so enormous that if even a modest part, an almost microscopic part, of the energy in matter can be made available for mechanical use, all other forms of storage will be put far in the shade. It is true that Lord Rutherford has thrown some cold water on our hopes in this direction, but the matter is still *sub judice.*

What the hope of achieving this in practice may be cannot be said in advance. Mr. Robert J. Van de Graaff, of the Institute's Department of Physics, with whom I have talked on this subject, is quite reasonably optimistic as to the ultimate possibility of realizing, mechanically at least, a large part of the energy which appears as a change of mass of the nucleus when one element is synthesized into others, as in the work of Cockcroft and Walton. This energy is only about one per cent of the total mass in the formation of helium from hydrogen, but is still far in excess of the energy available in the existing fuels. Mr. Van de Graaff has a fairly definite idea of what type of apparatus offers most promise of the mechanical utilization of this energy.

If these pious hopes are realized, not only will the problem of the storage of energy be solved, but the even more important problem of the production of energy will be solved in a measure far exceeding our utmost hopes by other methods. We have already pointed out one economic effect of this; namely, that transatlantic flight, or indeed flight over any distance whatever, would immediately become not only practicable but commonplace. The other consequences are even more startling. In the first place, with materials containing large amounts of energy so easy to transport bodily from place to place, the transportation of energy by transmission lines would immediately cease to be of importance, or even to be economically practicable. For example, the whole problem of the electrification of railroads would be changed at once. Energy would become a drug on the market, and the present tendency of replacing the laborer by the machine as a source of energy, as distinguished from the laborer as a source of judgment, would be intensified a thousandfold. Particularly would this be the case in the heavy industries. With an ample supply of power, the metallurgical industries would introduce electrolytic methods to a far greater degree than at the present time and there would be a great possibility of the use of low-grade ores and other raw materials which are now unused because of the great energy expense in handling so large a bulk. I refer, for example, to the possibility of obtaining aluminum from common clay.

Any such great cheapening of energy, therefore, could immediately result in a corresponding cheapening of materials. As far as engineering and industry are concerned, the disturbances introduced would be analogous to that overproduction which has so much to do with the present era of depression, but they would be on an incomparably greater scale. Our present government is convinced, and I believe rightly, that the

(*Concluded on page 72*)

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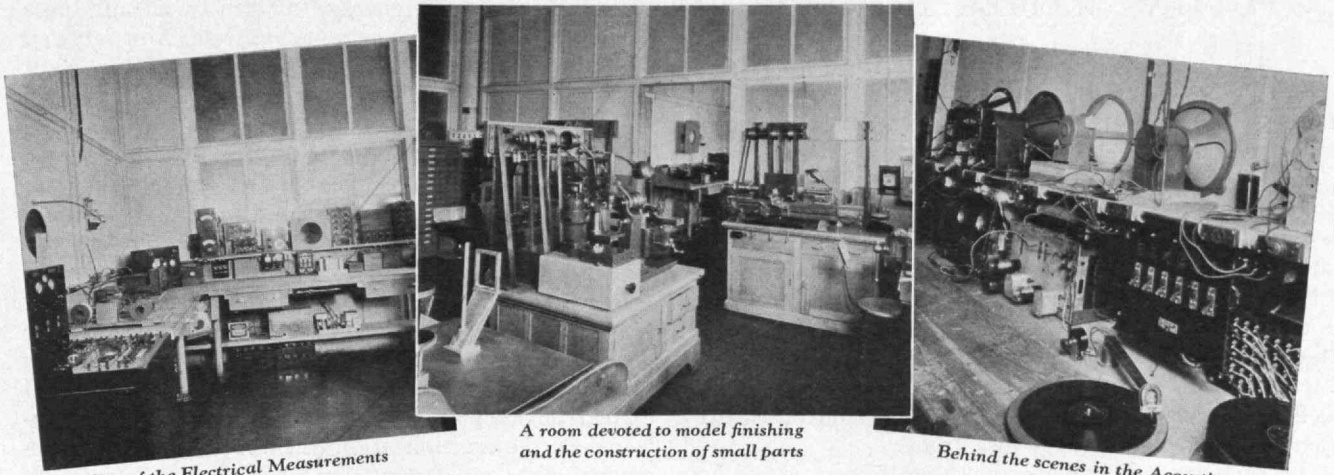
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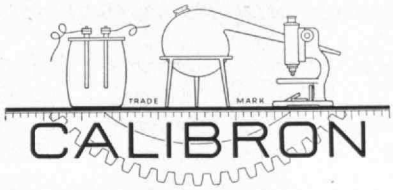
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PUTTING MATTER TO WORK

(*Concluded from page 70*)

economic disturbances of the day can only be ameliorated by organized industrial planning. This is because the equilibrium on which the old-time economics was postulated, which is due to the statistical interplay of the businesses of a large number of small competitors — so small that no single competitor dominates the situation — has been destroyed by modern invention. Cheap energy would destroy the possibility of such an equilibrium even more completely and would precipitate the need of a central control. With this control, cheap energy might easily lead to a period of prosperity such as has never yet been seen. Without this control, cheap energy must be completely disastrous.

There is one field which might seem to be touched in much less degree by cheap energy than that of manufacturing — I mean agriculture. After all, labor on the farm is much more subject to the law of diminishing returns than any other form of labor. The fertility of the soil, even with all possible addition of fertilizers and other chemical substances, is definitely limited. It has been suggested by J. B. S. Haldane, however, that the future of the food industries may not lie so much with agriculture as we think.

He has pointed out that the chemical synthesis of fats and sugars from inorganic materials is at last a commonplace laboratory phenomenon. There is no question that, with energy sufficiently cheap, these could be produced on a commercial scale. Now fats and sugars as made in the laboratory, while an important constituent of diet, are not by any means a complete diet. These same fats and sugars, however, combined with quite elementary organic nitrogenous compounds, which are also within the possibilities of synthesis from inorganic materials, will probably serve as a medium for the culture of such low forms of life as yeasts and bacteria. The yeast industry has already advertised its products as a source for "vitamins," important accessory substances of diet. It is by no means beyond the possibility of the future that the culture of such forms of life on materials synthesized from air, water, and carbon dioxide may be a chief source of food, in particular, since the multiplication of these beings is so enormously more rapid than that of the higher plants. Of course, this is a H. G. Wellsian dream, but I do not think that it is a dream which will wait long after the utilization of atomic energy for its achievement. Thus, a complicated economic situation will be rendered even more complicated and the sharp contrast of the possibilities of unheard of prosperity and unheard of ruin will be intensified still further. The day may come when we shall bless our stars that the misfortunes of the present years have induced us to familiarize ourselves with economic planning as a dress rehearsal for the real show which will be put on when and if atomic energy becomes available.

INFORMATION

THE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following circulars by their descriptive letters:

AB: For general information, admission requirements, subjects of instruction, ask for Bulletin AB.

C: For announcement of courses offered in Summer Session, ask for Bulletin C.

D: For information on Advanced Study and Research Work, ask for Bulletin D.

E: For the reports of the President and of the Treasurer, ask for Bulletin E.

Y: For a popularly written explanation of Engineering Courses, ask for Bulletin Y.

All inquiries sent to the address below will receive prompt attention

THE TECHNOLOGY REVIEW BUREAU

ROOM 11–203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS

G-E *Campus News*

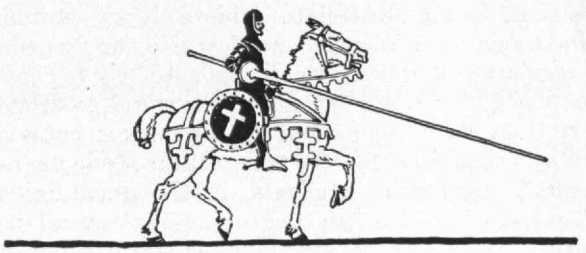


TALK FOR TRAINS

On a track near Schenectady, a few weeks ago, several visiting trade-journalists sat in a test car. From a loudspeaker in this car came a running stream of information. The voice was that of a G-E engineer in a "station" a half-mile down the track. Sample remarks:

"Believing that we could help railroads to speed the movement of freight trains, G.E. has now produced this device — a new system of communication. It's not radio, but, in principle, direct telephony. It's a distant cousin of the carrier-current communication that power companies use. They talk over the power lines; we use the rails, plus any wire line along the track. Now, the man in the caboose can talk with the man in the cab. It also works between trains up to 5 miles apart, and between trains and stations. Loudspeaker reception overcomes the train noises. Can you hear me all right?" They could.

Dr. Ernst Alexanderson, a G-E Consulting Engineer, is responsible for this development. He is a 1900 graduate of the Kungliga Tekniska Högskolan, Stockholm, Sweden. Incidentally, a partial indication of his versatility in engineering design will be found in the U.S. Patent Office, through which he has been granted more than 200 patents.

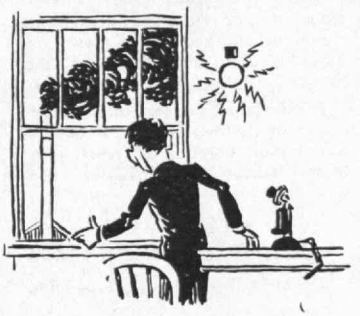


A RÖNTGEN WARRIOR

For the doctors who are waging continuous warfare against the dread, lurking specter of cancer, G-E research men believe they have provided another shining sword. Again they have produced the most powerful x-ray tube ever built—this time, for continuous operation in practical cancer therapy at the Mercy Hospital, Chicago. Dr. E. E. Charlton, Grinnell College, '13, is the man who directed the production of this tube.

The giant tube (brother under the glass to those in your radio) measures more than 14 feet in length, is rated 800,000 volts, will treat patients in a fraction of the time required by the last "most powerful" one, has x-ray radiation equivalent to $75,000,000 worth of radium (if there is that much!) and needs 20 gallons of Lake Michigan's coldest water every minute to keep cool.

It's a pleasure to make good motors and good lamps. It's a greater pleasure to help alleviate human ills—all in the line of duty! More tubes are on the way.



SMOKE IN THE EYE

An eye in the stack is worth two on the ground. So thought G-E engineers as they finished mulling over the smoke-nuisance problem of power and heating plants.

A light source and a photoelectric-relay unit were installed in stacks in Chicago and New Jersey. They are so arranged that when the stack is clear, light falls on the phototube; a meter or recording instrument registers zero smoke density. As the density increases, the phototube receives less light and indicates an increase in density. An adjustable electric contact is provided to operate an alarm. (A running record of the amount of smoke passed up the stack could be obtained by adding a recorder.) Thus, the "electric-eye," which is not affected by cinders and is never closed in sleep, has found another way to be of service.

Two G-E engineers, W. R. King and Pieter Juchter, developed this new smoke-density indicator. King is a '28 graduate of the U. of Kentucky, and Juchter a '24 graduate of the Eidgenössische Technische Hochschule, Zürich, Switzerland.

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TRAINING FOR LEADERSHIP

(*Continued from page 68*)

looks for it in the captains of tens as well as captains of thousands. How to train it into a boy I do not know, but one very effective way to train it out of him is to protect him from the consequences of his own acts. How often well-meaning parents do exactly this, thinking that they have done a kindness! Justice, tempered with parental mercy, is often gross injustice.

Given a knowledge of what needs to be done, plus that skill to make others want to do it which comes with courage, imagination, emotional stability, and a sense of justice — we still need a coöperative mental attitude if our leader is to be a builder not a wrecker. I was brought up to believe that if the quality of my work were superior and the quantity adequate, success would follow as the night the day. It is not so. The simplest essential of usefulness is coöperation with the other parts of the machine.

Where then does a boy get his training in coöperation? Only in the most liberally progressive schools is any formalized educational attempt made to teach students to work together. Usually the pupil is expected to study alone and to recite in competition with his classmates. He is left to learn the art of coöperation, if at all, in the cold, cold world, where he pays for the lesson with years of his life.

Certainly youth gets no inkling of the necessity of a coöperative mental attitude by reading the newspapers. An analysis of all the words used during the month of April, 1933, in the headlines of that most conservative of conservative organs, the Boston *Evening Transcript*, showed two-and-a-half times as many words like *attack*, *oppose*, *force*, *argue*, *disagree*, *warn*, *oust*, *smash*, *crush*, *assail*, *blame*, *contest*, *reject*, *accuse* . . . as words like *compromise*, *agree*, *invite*, *aid*, *help*, *relieve*, *confer*, *recommend*, *adopt*, *welcome*. The nearest approach to the use of *coöperate* was reference to a *coöperative bank*. Nor was there any nice use of terms which would differentiate between a long, sustained effort to achieve a result by overcoming obstacles and a quarrel to achieve it by straining human relations. *Threaten* and *fight* tied for first place in regularity of appearance; words not likely to convey the idea that coöperation makes the world go around.

Nothing can be done about the newspapers, but much can and should be done to train college students, particularly engineering students, in the unnatural art of coöperation. The practice of having several men work in the electrical, hydraulic, or steam laboratory together on predetermined experiments is, though hopeful, but the feeblest of beginnings.

Sophomore classes in mechanical drawing should be divided into groups according to ability. Each group should be allowed to decide what it wants to design; perhaps a small steam or gasoline engine for the more apt students and something as simple as a boy's cart for the laggards. Let facility in using instruments — now the main purpose — become the by-product of a coöperative effort.

When the design is complete, the project should then be carried through the pattern shop, the foundry, and the machine shop by the (*Continued on page 76*)



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TRAINING FOR LEADERSHIP

(*Continued from page 74*)

group, each student having his turn as foreman. There would be a new zest in these classes because the boys were creating something which integrated their studies; not just blindly drawing a gear tooth, or turning a bolt, because someone said so.

At the end of the term they might know fewer facts, though I doubt it, but they would have gone far toward developing self-reliance, the ability to study, and an appreciation of the necessity for coöperation. They would no longer be galley slaves rowing to the drum beat of an instructor; they would be learning the elements of leadership, not servitude.

It is equally possible for the aeronautical engineers to design, build, perhaps even fly a glider; the civil engineers to figure, construct, and test to destruction miniature bridge trusses — the entire group keen with excitement as to who can predict correctly which member will fail first. So one could go on multiplying the possibilities in electrical engineering, chemistry, physics.

Problems in such controversial subjects as philosophy, economics, or industrial relations should be studied in teams of not more than four men. The students soon discover that no two minds react alike; they acquire a desirable tolerance of the opinions of others; and they get an extra dividend out of solving such difficulties as making the lazy men do their part, or preventing the domineering ones from dominating the group, or indeed from settling the hour at which to confer.

How is the instructor to know the sheep from the goats in such herd problem-answering? Again let each member act as leader in rotation and write the report which the entire team signs. The difference in these reports will soon show who is who. Dissenting minority opinions, footnoted at the bottom or recorded in the margin, add relish to the student's work and light on the identity of the real thinkers.

Best of all, these men would soon learn to transfer their problems from the level of argument to that higher plane of, "We all want the same results. We disagree only as to the mechanics of achieving them. What methods will avoid the difficulties Smith fears and at the same time confer the advantages Brown desires?" At last the college would be teaching that leadership connotes organization; that organization requires coöperation.

Nor is this all. Honesty is almost invariably a question of the conflicting interests of two or more people. Under the present system a student has only to bluff his instructor. With a coöperative group he would also have to bluff his classmates; an achievement more difficult of performance and of which he would not be proud. Dishonesty is now often at a premium because there are many things encouraging the student to deceive the professor into believing that the boy knows more than he does, instead of training the student to go to the professor with the things he does not understand.

Undoubtedly there are men in our engineering schools who are incapable of participating in an educational plan of this sort. But they do not belong to the group from which leadership stems. (*Concluded on page 78*)

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TRAINING FOR LEADERSHIP

(*Concluded from page 76*)

The idea that education is something for everybody is a peculiarly American delusion. It is my feeling that 25% of the men who attempt college would have been better off if they had never gone; that 50% are neither benefited nor harmed; and that the other 25% rule the world. These ratios represent merely the impressions of a decade and are, therefore, offered under correction.

IN A COURSE intended for no other purpose than training for leadership, I should first of all try to show the students how to live. I should visualize for them not only what our industrial leaders have already done and how they did it, but also some of the things that remain to be done. More desire for leadership can be engendered by showing a boy that "beyond the Alps lies Italy," than by teaching him "how to approach an executive for a job."

The creation of interest and desire by stimulating the imagination are the first essentials of all leadership; a fact too often overlooked by teachers who think that, pedagogically at least, knowledge can get along quite adequately without skill.

Once a boy has espoused a cause, it is only necessary to show him how best to develop the skills that will promote achievement. If crossing his Alps involves knowing how to approach an executive, he will be eager to learn. I should expect to teach him far more about the technique of approach by letting him actually try it and then talking about it, than by merely lecturing. In this connection I should certainly use the case demonstration methods developed by Professor Elliott Dunlap Smith of Yale.

I very definitely would not try to teach the students any smart strategy by which to have their own way. In the long run character transcends the cleverest strategy. I would try, as Professor Smith has happily phrased it, to sensitize them to the lessons of experience. I would most certainly shake them loose from the feeling that human relations, like the postulates of physics, are to be expressed in formulæ and rules.

In such a course I should endeavor to teach the students that life is like a jig-saw puzzle which, if you would see the picture as it is, must be patiently put together bit by bit. At first the pieces seem to have little relation or meaning, but gradually intelligent study will show that there is both meaning and interrelationship. He who indiscriminately throws the pieces of his life into a box, possesses only a jumbled collection of unintegrated incidents; he who would see life and see it whole must pay the price of studying the pieces and justifying their contours. Sometimes they are assembled as a bird builds her nest; sometimes they are woven as a spider spins his web.

Last of all I should try to make the students realize that the only security they will ever know is confidence in their own ability to meet life; the only real disaster, the loss of their courage. Almost any calamity can befall a man without serious results as long as it does not ruin his mental attitude.

The secret of training for leadership is no secret. We all know that it does not lie in preaching, yet we bury our heads in the sand and expect to grow strong by nourishment alone. The truth is that parents, educators, employers, and students are unwilling to pay the price. Most of us have neither the wit nor the vigor necessary for the intelligent exercise by which to develop properly a knowledge, skill, and coöperative mental attitude worthy of enlightened leadership.

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CAMBRIDGE

ADVERSARIA

PWA, RFC, NRA

¶ Last month The Review recorded a long list of Technology men participating in the recovery work of the Federal Government. To this list now should be added 11 new names.

¶ Five M.I.T. graduates have been appointed to the Technical Board of Review of the PWA — a group of consulting engineers directly under Colonel Waite who act as a court of appeal on engineering problems. They are: MERTON L. EMERSON '04, industrial specialist; SAMUEL A. GREELEY '06, consulting engineer, water supply and sewage disposal; IRVING B. CROSBY '17, consulting geologist, collaborator on engineering work; LEROY K. SHERMAN '92 and GEORGE A. RICKER '86, civil engineer, municipal engineering. — JOHN BARRIGER '21 is now assistant to A. A. Berle, adviser on railroad affairs to the RFC. — Two M.I.T. men comprise a new Board of Sanitary Engineers for the District of Columbia: JOHN H. GREGORY '95 and SAMUEL A. GREELEY '06.

¶ FRANK R. HARRIS '25 has been engaged by the Emergency Relief Administration as supervisor of the work-for-relief of the West Essex district, New Jersey. — CHARLES H. PAUL '96, of Dayton, Ohio, was named a member of the Mississippi Drainage Area Board. — CHARLES L. HOMER '04 is an inspector for the NRA whose duty is to prevent code violations.

Guggenheim Medal to Dr. Hunsaker

¶ The 1933 Guggenheim medal, awarded for outstanding contributions to aeronautical science, was formally presented to Dr. JEROME C. HUNSAKER '12, newly appointed Head of Technology's Department of Mechanical Engineering, at a dinner given by the Society of Automotive Engineers in Chicago, August 31. Guests at the dinner, which formed part of the program of the International Automotive Engineering Congress, included members of the Institute of the Aeronautical Sciences, of which Dr. Hunsaker is President. The following day, Dr. Hunsaker addressed the aircraft session of the congress on "Airships for Commercial Purposes."

In Praise of M.I.T.'s Aeronautical Department

¶ The contributions which Technology and other educational institutions have made to aeronautical science drew praise recently from Eugene L. Vidal, Director of Air Regulation in the United States Department of Commerce.

Professors and instructors in aeronautical engineering often come to the Aeronautics Branch for suggestions as to particular problems which require research by their students. By giving them some of the practical problems which require substantial research and thought, the Aeronautics Branch has been able to guide this work in the directions which are likely to prove most useful. For several years, the M.I.T. has been building and testing various examples of detailed design commonly used in all-metal airplanes in an effort to learn more about the load distributions within the structures and the loads which various structural combinations carry. This work is also coördinated with the National Advisory Committee for Aeronautics' program of investigation of monocoque design through a committee on which the Department of Commerce has also a member.

40,000 Barrels a Day

¶ Technology men have played a prominent part in what is probably the most important development in the refining of petroleum during the last two years — the design and construction of the new large-scale cracking unit of a daily capacity of 40,000 barrels of oil at the Whiting (Ind.) plant of the Standard Oil Company. Refiners the world over are interested in studying this new unit, larger in capacity than any previously constructed, and which, together with special characteristics of the process itself, appears to offer advantages sufficient to more than offset its reduced flexibility.

The unit was constructed by the M. W. Kellogg Company of Jersey City on the basis of designs worked out by that company with experts of the Indiana Company, the physical basis of the design resting largely on the results of the research organizations of the two companies which are directed by Technology men. ROBERT E. WILSON '16 is in charge of research and development work of the Indiana Company, while the Research Laboratory of the company is headed directly by WALTER G. WHITMAN '17. Mr. Wilson was formerly Director of the Research Laboratory of Applied Chemistry at the Institute and Mr. Whitman was formerly Assistant Director. P. C. KEITH '22 was in charge of the work of the Kellogg Company and on the engineering staff of that company are: DUSTIN W. WILSON '17, formerly Director of the Buffalo Station of the School of Chemical Engineering Practice; HENRY O. FORREST '20, formerly Director of Technology's Research Laboratory of Applied Chemistry; and JOHN T. WARD, formerly Head of M.I.T.'s Division of Fuel and Gas Engineering.

It is also interesting to note that in the spring list of "men ranking among the leading representative chemical engineers throughout the United States" (prepared by the Executive Council of the American Institute of Chemical Engineers for the American Foundation), out of 41 names nine are Institute graduates; six are graduates from the chemical engineering school; one is a member of the Corporation; and five of them are or have been members of the Faculty of the Department of Chemical Engineering.

Science Aids Mickey Mouse

¶ The beautiful color effects now achieved in the Disney pictures have grown out of the research work of six Technology men. Though the history of color pictures starts in 1909, the Technicolor group, with which we are now concerned, began intensive work in 1915, credit for the initiation of the work going particularly to Drs. HERBERT T. KALMUS and DANIEL F. COMSTOCK, both members of the Class of 1904, and in later years members of the Institute's Department of Physics. Others associated in the enterprise were: LEONARD T. TROLAND '12, JOSEPH A. BALL '15, ERNEST A. WEAVER '15, and RUSSELL W. CONANT '23.

In the early days the impression of color depended on an alternation of red and green pictures on the screen in such rapid succession that they fused in the eye, the film being painted by a fine-pointed brush under a microscope. Since 1927 all Technicolor film has been manufactured by a new single-coated process with an emulsion coating only on one face. Means have been found for the blending of primary colors to permit a fairly flexible scale of combinations.

Those who laughed so easily at "The Three Little Pigs," not to mention the Big Bad Wolf, pause to think of the intensive research and technical skill which contributed to that laugh! You recall the amusing touch when the wicked wolf, huffing and puffing in an effort to blow the brick house in, turns blue in the face? In such subtle ways does science make its contribution to the amusement industry.

At present the water colors are prepared with the figures drawn on celluloid sheets, which are superimposed on a tinted background of heavy drawing paper. A special camera is used, whereby each color value is accurately photographed on the negative. The negative is developed and the positive prints made from it by the Technicolor process. Precision methods have done much to eliminate "color fringing," or a lack of distinct outline.

Original Technicolor experiments were conducted in Boston, while present research is centered in Hollywood with the idea of extending the use of color in the film industry.

Retired

¶ EDWIN H. BLASHFIELD '69, dean of American mural painters and "one of New York's dwindling links with the Mauve Decade." In September he gave up his studio in Carnegie Hall, where he worked for 35 years and achieved his fame. He is building a new studio at South Dennis on Cape Cod, where he will attempt only small canvasses. Mr. Blashfield was at one time President of the American Academy of Design. He is known especially to Technology men as the artist who painted the murals in the Walker Memorial.

In the News

¶ WALDEMAR LINDGREN, retired Head of M.I.T.'s Department of Geology, as head of the field party of members of the International Geological Congress which visited many mining districts of the Southwest on their way to the Coast.

¶ CLAYTON W. PIKE '89. A write-up of his career appeared in the *Press Herald* (Portland, Maine), as a consulting electrical engineer of national reputation.

¶ ANNA GALLUP '01, on representing the Institute at the Conference of Women's Clubs at the Waldorf-Astoria in New York, October 12 and 13.

¶ FARLEY GANNETT '02, on representing M.I.T. at the Sesquicentennial of Dickinson College, October 20 and 22.

¶ FREDERIC C. HIRONS '03, as one of the two architects chosen for their design of the new Municipal Memorial auditorium to be built in Worcester, Mass. After five years in the office of Robert D. Hale, Mr. Hirons took the architectural course at M.I.T., where he won the Rotch traveling scholarship. He won the Paris prize in America in 1906 and returned to France, later spending much time abroad. Until recently he was connected with the New York firm of Dennison and Hirons. In 1926 he was elected to the Legion of Honor by the French Government.

¶ ROYCE W. GILBERT '09, of Chase and Gilbert, in connection with the timber and coal resources of Newfoundland, which involves removing the Newfoundland railroad and steamship lines from government operation and spending $21,000,000, now under consideration. The project is compared to the celebrated East India Company in the development of India and is also described as a sort of modified RFC. Mr. Gilbert's firm has been retained to study and recommend plans for the enterprise.

¶ PORTER ADAMS '14, for his invention of a wind resistance tunnel and balance for testing all types of motor-dependent vehicles for lift and wind resistance.

¶ LAMMOT DU PONT, President of E. I. du Pont de Nemours and Company, for his defence of company unions, whereby the employees elect representatives who may confer with an equal number of representatives of the plant management and discuss employee-employer relations, making such requests upon the management as the representatives see fit. No membership or dues are required, and no expense to the employee is involved. These unions, he claims, are in no way defeating the labor section of the NRA, as they "may organize under the American Federation of Labor if they see fit" or join any other union or not.

Written

¶ By EDWARD F. STEVENS '83, Fellow of the American Institute of Architects and member of the American Hospital Association, a book entitled "The American Hospital of the Twentieth Century," which, in new edition, discusses every phase of hospital planning and equipment.

¶ By ALICE G. BRYANT '86, an article entitled "Values for Which Mrs. Ellen H. Richards Stood," in the Medical and Professional Woman's *Journal*, August, 1933. The paper was read on Ellen H. Richards Memorial Day, December 2, 1932, at the M.I.T. Women's Association, and is an excellent commentary on the life of Technology's first woman graduate.

¶ By JOSEPH P. MAXFIELD '10, a book entitled "The Voice: Its Production and Reproduction," in collaboration with Douglas Stanley. The book contains the results of expert research previously unpublished and should prove of interest to radio and telephone engineers, acoustical engineers, studio directors, and sound recording technicians.

¶ By CYRIL S. SMITH '26, a paper on "The Interconversion of Atomic, Weight, and Volume Percentages in Binary and Ternary Systems," presented at the fall meeting of the American Institute of Mining and Metallurgical Engineers, in Detroit. Mr. Smith was also Chairman of the Technical Session of the Institute of Metals Division.

¶ By LAURENCE C. HICKS '33, a paper on "An X-Ray Study of the Diffusion of Chromium into Iron," presented at the same meeting of the A.I.M.M.E.

¶ By WILLIAM H. WALKER, member of the Institute's faculty from 1894 to 1926, an article on "Chemistry and the Layman" in the Southern California Alumni *Review* for September. The article gives a complete analysis of the profession of chemical engineering, with explanations of engineering inventions and the part they have played in modern civilization.

Deaths

¶ ION LEWIS '78, on August 29.

¶ EDMUND H. BROWN '81, on May 24.

¶ FRANK D. CARNEY '87, on October 3. Immediately after graduation Mr. Carney went to the Pennsylvania Steel Company at Steelton, Pa., where he obtained practical experience and became superintendent and metallurgical engineer. In 1897 he went to Germany in the employ of Ludwig Lomore and Company as their consulting metallurgical engineer. He remained until 1902 when he returned to the United States to become general superintendent of the Pennsylvania Steel Company, remaining in that position until 1915, when he was appointed general metallurgist of the Bethlehem Steel Company. In 1918 he resigned to open offices for himself in New York as a consultant, which he maintained until his retirement in 1932.

He was a member of the British Iron and Steel Institute, American Iron and Steel Institute, American Society of Testing Materials, and the American Institute of Mining and Metallurgical Engineers.

¶ JOHN L. MAURAN '89, internationally known architect, on September 23. After leaving the Institute, Mr. Mauran spent a year of travel and study in Europe, before entering the office of Shepley, Rutan and Coolidge, prominent Boston architects. For this firm he helped design the Chicago Public Library and the Chicago Art Institute. He became the firm's St. Louis representative in 1893 and later its St. Louis partner. In 1900, he formed Mauran, Russell and Garden, the title of the partnership becoming Mauran, Russell and Crowell in 1911.

His non-professional activities were numerous. Since 1917 he had been on the Executive Committee of the American Red Cross in St. Louis, serving as its chairman from 1922 to 1928. During the World War he was on several national war committees. He was chairman of the Public Buildings Commission of St. Louis, 1904; President of the St. Louis Grand Opera Committee, 1910 to 1912; chairman of the "Made in St. Louis" Carnival, 1915; President of the Plaza Commission since 1925; President of the New England Society of St. Louis, 1913; a member of the Republican State Committee, 1926 to 1929; President of the Board of Trustees of the Church of the Messiah, 1900 to 1920; and a member of the Corporation of the M.I.T.

¶ L. HENRY KUNHARDT '89, on September 30.

¶ ARTHUR A. WITHINGTON '92, on September 25.

¶ FARLEY OSGOOD '97, on October 6. The year of his graduation from M.I.T., Mr. Osgood entered the employ of the American Telephone and Telegraph Company and rose to the position of technical division manager of that organization. In 1903 he became general manager and chief engineer of the New Milford Power Company in Connecticut. He held that position until 1907, when he joined the Public Service Corporation of New Jersey, of which he became Vice-President and general manager.

Mr. Osgood was a member of the Engineers Club, the New York Electrical Society, the National Electric Light Association, and was President of the American Institute of Electrical Engineers for 1924–1925.

¶ WALTER H. FARMER '02, Director of Rayon and Cellophane Research for the du Pont interests, on September 20.

¶ RICHARD G. HARTSHORNE '04, on September 26.

¶ A. RUSSELL ATWATER '13, on September 10.

¶ HERBERT B. COBB '22, on September 30.

¶ ROBERT LAMORETTI '31, on September 2. (Brief account in class notes.)

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Chicago

On Wednesday, September 13, an M.I.T. luncheon was held at the University Club for all Technology alumni and members of the instructing staff who were attending the convention of the American Chemical Society held in Chicago during the week of September 11.

L. C. Cooley, President of the Technology Club of Chicago, welcomed about 32 alumni from various parts of the country. R. E. Wilson, '16, General Chairman of the American Chemical Society Convention Committee, made a few remarks during the luncheon. Everyone present was very much pleased to see Professor J. F. Norris, who spoke briefly on the affairs at the Institute. Members of the Class of 1917 seemed to predominate, there being about seven present. The number of them present, plus the fact that nearly all of them registered bald at such an early age, called for special comment.

The Technology exhibit at a Century of Progress has been drawing large numbers of visitors and appears to have been well worth the time and effort expended by the Institute in preparing it. — WINFIELD I. MCNEILL '17, *Secretary*, Colgate-Palmolive-Peet Company, 919 North Michigan Avenue, Chicago, Ill.

Technology Club of Panama

Meade Bolton '16, in the following letter, revives pleasant memories of a visit made by the club representative to the Canal Zone in 1924. On that occasion Billy Grimes '08 was our genial host and unfolded to our gaze the wonders of Cristobal and old Colon. Bolton writes:

"Since Billy Grimes left the Canal Zone and Panama (now with Electric Bond and Share Company, New York City), I have been Secretary as well as President of the local Technology Club. This club was organized 17 years ago by Billy, who elected to be Secretary and who made me President, mainly because I was fresh from Tech and remembered a number of Tech songs, which made a hit with Billy for Billy does love to sing. In those days the engineers and the architects of the Panama Canal and their friends met occasionally at the 'Corco' in Panama City for interesting and memorable *soirées*. There were always many Technology men present: Bill Haugaard, now New York State Architect, Guy True, and others, who added to the liveliness of the evenings. But those days are past and we have no more meetings. Once we did have a pleasant lunch at the Tivoli Hotel with President Stratton, whom Governor Walker permitted us to corral during his visit here. There were about a dozen Tech men present, including Mabbott '12, Icaza '23, and Herringshaw '21. A most informal affair, but memorable.

"Some Technology men at present in the Canal Zone are Captain R. W. Ryden '07, Lieutenant Roy Cowdrey '23, Major H. L. Robb '21, Major W. E. R. Covell '23, who is assistant to the Governor, and Eckberg '22. Ryden is superintendent of the Mechanical Division with Cowdrey as his assistant. Moore is Assistant Office Engineer.

"Among the Tech men who have recently passed this way have been: Lieutenant Hal Neilson '16, from Hawaii; St. Elmo Pisa '15, and Captain Maynard Griffith '14, master of the S.S. *President Lincoln*. Griffith is now sick in some hospital on the West Coast and the last trip of the ship through the Canal was made without him.

"I envy the smooth tongues (or do I mean pens?) of such men as Ray Stevens, C. E. Locke, and A. W. Rowe, whose class notes I never fail to read. Each number of The Review gets read from cover to cover. Goldberg's article and Locke's letter from Hampton in the July number were particularly interesting. I know Hampton well."

Bolton is pursuing his architectural work with office at Balboa Heights. — GEORGE E. RUSSELL, '00, *Representative*, Room 1-281, M.I.T., Cambridge, Mass. MEADE BOLTON '16, *Secretary*, Box 23, Balboa Heights, Canal Zone.

Rocky Mountain Technology Club

The club held a picnic at the summer home of Fred Baker at Evergreen, Colo., on July 8. At this picnic were some 10 or 12 members with their families. Two foursomes enjoyed a good game of golf although the game ended in a heavy rain storm. An evening of inside entertainment followed a picnic supper. Dr. Severance Burrage '92 has set a record in our opinion by playing 65 holes of golf on his 65th birthday.

At the September 8 meeting were several visitors: Mr. Watson, now a senior at Technology; Mr. Jones, of Colorado University, who will attend Technology next year; Mr. Paul Borth, who will take graduate work in electrical engineering this year; and Mr. Duane Wood, who has been awarded the regional scholarship and will attend Technology this year. Mr. H. O. Bosworth has been named the Chairman of Boy's Work and gave a welcome to the visitors. Let this serve as a reminder that the club always welcomes traveling Technology men. — MAXWELL PARSHALL '28, *Secretary*, 926 Akin Avenue, Fort Collins, Colo.

Technology Club of New York

The club, under the vigorous leadership of President Jim Burbank, is planning to get away to a flying start on its program of controlled inflation of activities for the year 1933–1934.

So thoroughly successful was the annual meeting last spring, at which, it will be remembered the mellifluous words of Tubby Rogers combined with the amber flow of three point two to bring down the house, that plans are afoot to repeat such entertaining evenings more frequently throughout the year.

The first play-off for the handsome Ranger Bridge Trophy will find our embattled members fighting it out around the bridge tables in October. A record entry list is expected.

Extensive alterations in the club quarters will be completed shortly. The daily luncheon meetings are getting a hearty response from members within reach of the club at the sound of the dinner bell. — MILTON MALE '29, *Secretary*, 71 Broadway, New York, N. Y.

Washington Society of the M. I. T.

The opening luncheon meeting for the season 1933–34, instead of being held the third Friday in October as heretofore, was this year advanced to Friday, September 22, 1933, and as usual was held at the University Club at 12:45 P.M.

In lieu of a formal speaker it was decided by the Executive Committee that the meeting be a general get-together because of the large number of alumni newly in Washington in connection with the work of the N.R.A. and Public Works Administration.

After the luncheon the meeting was initiated by Dr. Harry W. Tyler '84, who called upon all those present to rise in order and not only give their names and classes but also explain so far as they cared to do so why they happened to be in Washington. The responses were most interesting and some of those present made no bones of the fact that they had axes to grind and hoped the other members would assist in the grinding.

Following this auspicious beginning Proctor L. Dougherty '97, Honorary Secretary for the Washington Area, presented the report of the Scholarship Committee announcing the award of the scholarship to Miss Margaret Sara Vinson and the reasons leading the Committee to consider her the most meritorious of the candidates. From the comment it appeared that the Committee's choice had unanimous approval.

A. M. Holcombe '04 then drew attention to the exceptional opportunity for coöperation between those members of the society who had long been in the

public service, those newly entering it and just beginning to find their way around, and those not in the service but having business with it, after which there was some discussion of the type of programs to be preferred for the present season.

Following this our past President, Kenneth P. Armstrong '10 gave an impromptu account of the supervising architects' side of the present controversy being waged by that office with the Director of the Budget, Hon. Lewis W. Douglas '17. In the course of his remarks, Mr. Armstrong pointed out why various federal building projects criticized as "pork" are not even related to the animal but would really constitute creditable Scotch economy. As the Public Works men present were not connected with the federal building program and as the Director of the Budget was not in attendance, Mr. Armstrong's remarks went unanswered, but he promised to repeat the same whenever proponents of the other side of the controversy could be enticed to appear.

The society was pleased to have as its guest Arthur M. Miller '17, visiting Washington from New York. Among those present were the following members: Benjamin F. Thomas, Jr. '13, W. A. MacMahon '22, A. E. Hanson '14, Frank L. Ahern '14, Julius E. Nolte '98, Bion A. Bowman '09, C. B. Allen '29, B. E. Sherrill '27, A. L. Sherman '06, W. E. Lutz '18, Charles H. Deetz '89, C. P. Kerr '11, Howard P. Emerson '28, M. L. Emerson '04, A. M. Holcombe '04, E. D. Merrill '09, John D. Fitch '24, H. E. Whitaker '09, Edwin A. Packard '99, Louis H. Tripp '06, Allen Pope '07, Francis G. Wells '22, Ferdinand F. Schneider '92, Kenneth P. Armstrong '10, Martin Boyle '98, Frederick E. Fowle '94, O. G. Green '30, Harry W. Tyler '84, President: Proctor L. Dougherty '97, Honorary Secretary, and the Secretary. — JOSEPH Y. HOUGHTON '26, *Secretary*, 402 Shepherd Street, Chevy Chase, Md.

M. I. T. Club of Western Maine

Another very enjoyable party was held by the M.I.T. Alumni Association of Western Maine at Douglas Hill Inn on Sunday, the 10th of September. The party gradually congregated during the latter part of the forenoon, and after the usual amount of small talk, about 30 of us with our wives and families sat down to a chicken dinner which upheld the traditional reputation of our gracious hosts, Dennie and Mrs. Orville B. Denison. During the dinner we were much pleased to learn that Dennie had received a telephone message from President Karl T. Compton from Bluehill, Maine, where he is spending the summer, expressing his regrets at being unable to attend. Douglas Hill is no place to consider the cares of the day, even though they be as trivial as the affairs of the M.I.T. Alumni Association of Western Maine, and for that reason no meeting was held. Instead the members of the party sought the many pleasures which that beauty spot afforded. Tom Estabrook '05, of Portland, won the golf tournament; Bill Todd '04, of Portland, and Mrs. Clara S. Birkenwold of Augusta, the shuffle board tournament; and Miss Esther M. Barlow, of Portland, the obstacle golf match.

Others attending were City Manager James E. Barlow '05, Mrs. Barlow, and J. Robert Barlow of Portland; Clayton W. Pike '89, Mrs. Pike, and Miss Helen F. Pike, of Fryeburg and Philadelphia; Lester I. Beal '18 and Mrs. Beal, Lewis D. Nisbet '09 and Mrs. Nisbet, Mrs. William N. Todd and Miss Barbara Todd, Dr. Hirsh W. Sulkowitch '28, all of Portland; Horace L. Clarke '09 and Mrs. Clarke, and the Misses Louise, Beatrice, and Jean Clarke of Sanford; Hillard D. Cook '21, Mrs. Cook and John and Jackson Cook of Gardiner; Edward Birkenwold '29 and Miss Lois M. Hayden, of Augusta; and Alfred E. B. Hall '15 and Mrs. Hall, of Saco.

The annual meeting will be held later in the fall in Yarmouth, the club being the guest of Stanley W. Hyde '17, Principal of North Yarmouth Academy. — ALFRED E. B. HALL, '15, *Secretary*, 94 Beach Street, Saco, Maine.

CLASS NOTES

1872

Mr. and Mrs. William Quincy Wales celebrated the Golden Anniversary of their wedding at the Brae Burn Country Club on September 11. They both seem hale and hearty.

Forty years ago the Secretary helped found the Society for the Promotion of Engineering Education at the Chicago Exposition of 1893. He attended this year the 40th anniversary at Chicago and received a certificate as a founder of the society. There were about a dozen of the founders present. The Secretary is now the senior past President of the society.

'72 men are now becoming scarce and there is not much of importance to be noted about them. — C. FRANK ALLEN, *Secretary*, 88 Montview Street, West Roxbury, Mass.

1888

Several classmates have written your Secretary that they think the group photograph taken at our 45th reunion at Rockport shows a fine likeness of each of the 25 men present and that the photographer knew his business. Also, several have advised that the copies of snapshots taken by Ned Webster at the Folly Cove clambake and around the hotel and sent to them have proved to be very interesting souvenirs of the occasion.

Ben Buttolph writes: "We were certainly favored in weather and the arrangements could not have been improved upon." The committee bow their thanks to Ben for the last half of his statement. Ben suggests the possibility that young Gene Daniell, who planted a tear gas bomb in the New York Stock Exchange in August, might be the son of our classmate of the same name. We hope not.

Our classmate, John Murchison Sully, one of the best known mining engineers in the entire southwestern portion of the country, was taken with a heart attack while on a brief sojourn in California with Mrs. Sully early in July and died soon after reaching his home in Santa Rita, N. M., on July 15. Sully was General Manager of the Chino Mines of the Nevada Consolidated Copper Company at Santa Rita, N. M. He was born in Dedham, Mass., and entered the Institute from Cambridge. He was connected with mining and water works companies in Montana, New Jersey, Tennessee, Alabama, Georgia, Missouri, California, Mexico, and New Mexico.

Sully was a member of the American Institute of Mining and Metallurgical Engineers, State Vice-President of the American Mining Congress, and a member of the Board of Regents of the New Mexico State School of Mines. He is survived by his wife, Mrs. Marjorie Bloom Sully; four sons, John, Allan, Kenneth M., and James Sully; and three daughters, Gertrude, Agnes, and Ruth Sully. A splendid appreciation of Sully has been written by Mr. D. C. Jackling in the September issue of *Mining and Metallurgy* and we advise every classmate to obtain a copy and read the details of his accomplishments.

Only a day or two before these notes were due in the Editor's office, we received an excerpt from a letter to the Alumni Association by Charles R. Muhlenberg, son of our classmate Frederick H. Muhlenberg, stating that his father had died on June 18, very suddenly of a heart attack while apparently in good health. Muhlenberg came to the Institute from Reading, Pa., and with the exception of two years on engineering work in Wilmington, Del., had lived there ever since. Since 1891 he has been a practicing architect in Reading having a very large amount of work locally to his credit. He was associated with his brother, Charles H. '92 and he also had two sons who were graduates of the Institute, Charles R. '25 and Henry E. '27. He was a member of the American Institute of Architects.

Muhle, as his intimates called him, was present at our class reunion in 1916. He is survived by his widow and four children. He had planned to be present at Rockport in June for our 45th but was unable to come. His classmates mourn his passing. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine.

1890

Colonel H. M. Waite has been named a Deputy Public Works Administrator, under Title II of the Recovery Act. He was formerly Chief Engineer of the Cincinnati Union Terminal Company. Since July 11, he has served unofficially as one of the staff of General Hugh S. Johnson to organize the public works administration.

In 1914 he became City Manager of Dayton, Ohio. During the war he served as a Colonel, and was with the first division to enter Germany after the

1890 Continued

treaty was signed. He is the right-hand man of Secretary Ickes; and with his Aids he is making a flight across the country to speed up the public works drive. He was in Boston, September 14, and at the State House, but your Secretary did not know it in time to get in touch with him, but next time Chic comes to Boston, we hope to get together.

A card has been received from Dr. and Mrs. Franklin W. White announcing the marriage of their daughter, Ethel Warren, to Dr. Ronald Lyman McFarlan, on September 6, at Boston.

"Calvin Rice, Secretary of the American Society of Mechanical Engineers, in a letter to the *Times* recently expressed 'a profound feeling of respect and admiration' for the generosity of private citizens of Chicago in making possible an array of museums rivaled only by government-supported institutions in the largest European capitals." The above item appeared in a recent issue of the *Times* as the leading paragraph of an editorial on New York's lack of scientific and industrial museums, under the title "Wanted: A Founder." — GEORGE L. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass.

1893

The Fortieth Reunion of the Class was held on Saturday and Sunday, June 3 and 4, and was most successful from every standpoint. We assembled Saturday afternoon at two o'clock on the Esplanade in front of Tech and motored to the Essex County Club in Manchester, Mass., the facilities of which were accorded the class through our Class President, Billy Forbes. Arriving at the Club at about 3:15, rooms were assigned, clothes changed, and the works were started. Golf, tennis, hiking, and visiting were on the docket for the afternoon. Wives and offspring joined in all the doings. We were highly pleased that Dr. Compton (an honorary member of our Class) and Mrs. Compton were of the party and the genial manner in which they entered into the festivities made everyone feel that they were "of the Class."

Everything was most informal including dress. At 7:15 we assembled and the informalities of the evening began. Dinner was served at 7:45, preceded by a Class Cheer for M.I.T. and one for Mrs. Compton. During dinner Farwell Bemis insisted on stirring up things, separating husbands, wives, and offspring after each course and he got away with it. While coffee was being served, each lady was presented with a gold pencil and each man with a pewter stein, similar to the steins of our Twentieth and Thirtieth reunions. After dinner, Billy Forbes, in a few well chosen words (?) welcomed the ladies and our guests, Mr. John K. Howard and Mr. William E. Chamberlain, punctuating his remarks with stories which he *said* were true. Fred Fay pulled off the usual Class stuff, including letters and telegrams from absent members covering the range from Frank Badger in London to J. E. Woodbridge in San Francisco. Ned Blake, from the Maine General Hospital at Portland, sent a letter in which he proposed the following pledge: "I promise to attend the Fiftieth Anniversary and to bring my girl, and to bring at least one couple not here on the Fortieth." This was solemnly subscribed to by all present. Dr. Compton was called on and he opened his remarks with "Fellow Classmates" — and then everybody felt perfectly at home. He seemed to be rather proud of his Class which certainly was another sympathetic note. Needless to say, he received hearty applause, for his remarks were all perfectly true. We admit it.

After dinner we assembled in the recreation hall and Billy Forbes introduced his friend Mr. Chamberlain, Assistant Vice-President of the State Street Trust Company, Boston, who had kindly consented to put on a sleight-of-hand performance. He had no paraphernalia, stood close to his audience with sleeves rolled up, and fooled us completely for some 40 minutes. He was mighty good and everyone was delighted.

Another friend of Billy Forbes was next introduced, Mr. Howard, a world-wide traveler and camera hunter, who entertained us for an hour or more with motion pictures of wild life in Africa and also pictures of some of his travels in Central and South America. Unusual, stirring, and fascinating reels were ably described by Mr. Howard. This concluded the evening's entertainment.

Sunday morning breakfast was served from 8:30 to 9:30 and then the golfers and tennis players got busy and others selected their own forms of recreation. Everybody appeared to be happy. At 1:30, just before going into lunch, Farwell Bemis took a motion picture of the whole party in motion on the lawn and also some still pictures. After lunch we gathered in the main lounge and with Mr. Harrison at the piano, John Codman gave a song recital. His numbers were well chosen, beautifully rendered, and thoroughly appreciated.

At four P.M., we lowered the '93 banner, said good-bye to the Essex County Club and motored to Billy Forbes' estate, "Lone Tree Farm," in Hamilton. After much persuasion, Billy exhibited some of his horses, putting them over the jumps to the delight of all the assembled guests, including Farwell Bemis with his motion picture machine, and we are hoping that the pictures come out well. A friend of Billy's, Ike Thomas, dropped in and was forced to recite "David and Goliath" and also "Jonah and the Whale." These were screams. Much to the surprise of everyone, Billy's afternoon tea turned out to be a regular spread with all the fixings, both wet and dry. Mrs. Billy was a most charming hostess and, while this was her first meeting with the Class, she entered into the spirit of the occasion like an old-timer. Thus ended the Fortieth Reunion of the "Great Class of '93." (Note: The Secretary assumes no responsibility for the foregoing. He "let George do it.")

Those present at the Essex County Club were: Dr. Karl T. Compton and Mrs. Compton, John K. Howard, William E. Chamberlain, and Mr. and Mrs. Harrison; F. B. Abbott, A. F. Bemis, Mrs. Bemis, Miss Alice Bemis, M. B. Biscoe, Mrs. Biscoe, G. T. Blood, Mrs. Blood, C. R. Boss, Mrs. Boss, S. A. Breed, Mrs. Breed, J. S. Codman, Mrs. Codman, C. N. Cook, C. R. Darrow, H. N. Dawes, F. N. Dillon, A. B. Edwards, Mrs. Edwards, J. A. Emery, J. A. Emery, Jr., F. W. Fabyan, Mrs. Fabyan, Mrs. Theodore Frothingham, Jr. (Eleanor Fabyan), F. H. Fay, Mrs. Fay, Miss Betty Fay, W. S. Forbes, Mrs. Forbes, H. A. Gilson, Mrs. Gilson, G. B. Glidden, Mrs. Glidden, Maurice Gorham, W. H. Graves, C. F. Hopewell, Mrs. Hopewell, D. D. Jackson, A. L. Kendall, F. H. Keyes, Mrs. Keyes, W. F. Lamb, H. M. Latham, Mrs. Latham, F. F. Low, Mrs. Low, A. M. Moody, H. A. Morss, Mrs. Morss, W. H. Norris, Mrs. Norris, Edward Page, E. S. Page, Mrs. Page, A. S. Pevear, Miss Dorothy W. Pevear, F. D. Smith, Mrs. Smith, J. I. Solomon, C. M. Spofford, Mrs. Spofford, C. M. Taylor, J. F. Tomfohrde, A. B. Wadsworth, C. R. Walker, Mrs. Walker.

Miss Alice Bemis, second daughter of Mr. and Mrs. Albert Farwell Bemis, was married June 17, 1933. From the Boston *Herald* is taken the following account: "A simple though lovely wedding of yesterday, among the New Hampshire hills, was that of Miss Alice Bemis, daughter of Mr. and Mrs. Albert Farwell Bemis of Chestnut Hill, and Mr. Charles Goodrich Thompson, son of Mr. and Mrs. William Goodrich Thompson, also of Chestnut Hill. The ceremony, at 12:30 o'clock in the Church of St. Andrews in the Valley, in Tamworth, N. H., was followed by a reception at 'Lontano,' the summer home of Mr. and Mrs. Bemis at South Tamworth. A feature of especial interest was the presence at the wedding of two brides of the spring: Mrs. John Gaw Meem, sister of the bride, who was Miss Faith Bemis before her marriage to Mr. Meem on May 20; and Mrs. Nicolas de Tyrtoff, sister of the bridegroom, who was Miss Katherine Thompson previous to her marriage to Mr. de Tyrtoff on May 13. Both he and Mr. Meem were at yesterday's nuptials. Mr. Thompson is the grandson of the late Dr. William Reed Huntington of Grace Church, New York. He was graduated from Harvard in 1927, afterward studying at the London School of Economics and graduating from the Harvard Law school in 1931. His clubs are the Harvard Club of Boston and the Harvard Club and Lawyers Club of New York. At college he belonged to the Signet Society, the Phoenix, S. K., Speakers' Club, and Lincoln's Inn. The bride attended the Buckingham school in Cambridge, Chateau Brilliantmont in Lausanne, Switzerland, and the Ferris School in Paris, as well as Bryn Mawr and the Museum of Fine Arts. She made her début in 1927 and belongs to the Junior League. She is also a member of the Cosmopolitan Club of New York. Following a wedding trip, Mr. and Mrs. Thompson will live at St. James, L. I., receiving friends after July 15."

1893 Continued

Edmund E. Blake, who missed the June reunion by being confined at the Maine General Hospital in Portland as a result of a surgical operation, was able to return to his home, 79 North Street, Saco, Maine, shortly thereafter and reports the operation a complete success with recovery rapid.

Grosvenor T. Blood, whose professional career has been spent solely with the American Bell Telephone Company and its successor, the American Telephone and Telegraph Company, and who has been located at the New York office of the latter Company since 1907, has retired from active service and with Mrs. Blood is enjoying well-earned leisure at their home 200 Prospect Street, East Orange, N. J.

Charles E. Buchholz' many friends will be delighted to learn that, after a prolonged stay at Saranac Lake, N. Y., his health is so far regained that he is able to resume business activity in the coal trade, which he entered in 1904 after many years' engineering service with the New York Central Railroad. He writes: "I have had an extremely good lesson and probably for the rest of my life shall make it an object to conserve my strength and, like the cracked pitcher, will refrain from going to the well, as it has become a habit with me now to make very little physical exertion. I must confess I am having a real good time working a little, enjoying the movies, and my friends. I am in Watertown, where I started my business career after leaving Tech and do not think I will move again, having seen most of the United States and Canada while active." Charlie's address is 212 Sterling Street, Watertown, N. Y.

Miss Katherine Emery, daughter of James A. Emery of New York and Montclair, made her first stage appearance in Boston at the Tremont Theatre on September 11 in "Brittle Heaven," the purported love story of Emily Dickinson, the American poetess, who was born in 1830, and whose writings, published for the most part on the 100th anniversary of her birth, are now being received with their deserved appreciation. The play is characterized as the American counterpart of the English play, "The Barretts of Wimpole Street," which portrays the life of Elizabeth Barrett Browning. "Brittle Heaven" falls in the period of the Civil War. In taking the leading part of Emily Dickinson, the burden of the play fell upon Miss Emery. Hers was an admirable interpretation which gives promise of a successful stage career.

News of the death of Ira J. Francis on March 8, 1932, has only recently reached the Alumni Office. Francis was for a time a special student with the class in the Electrical Engineering Course. Most of his life, after leaving the Institute, was spent on the Pacific coast, where for many years he was President of John A. Roebling's Sons Company at San Francisco.

Henry A. Morss, Jr., and Sherman Morss, sons of Mr. and Mrs. Henry A. Morss, of Boston and Marblehead Neck, sailed to England the past summer in their schooner yacht *Grenadier* to participate in the Fastnet Cup ocean race. The *Grenadier*, of the Eastern Yacht Club fleet, is an auxiliary schooner, 59 feet overall and 42 feet on the water line. The Morss brothers took along several friends, making a crew of seven in all, of whom five were this year's graduates of Harvard. Leaving Marblehead on June 19, the *Grenadier* had a smooth crossing and arrived at Cowes, Isle of Wight, July 10, a voyage of 21 days. The Fastnet race, over a 700-mile course, was started from the Isle of Wight, July 22, and was completed in six days by the *Grenadier*, which took second place. Henry, Senior, accompanied by Mrs. Morss, their youngest son, Wells, and their daughters, Eleanor and Virginia, spent the summer on the continent and in England, reaching Cowes in season for the Fastnet race. While there, they visited the Rigby Wasons of London at their summer home at the western end of the Isle of Wight. It had been the intention of the crew of the *Grenadier* to sail her back to America in August. Unfortunately, while lying at her mooring in Cowes harbor, she and several other yachts were damaged by an excursion steamer which ran adrift. Consequently the *Grenadier* was brought to New York aboard the *Berengaria* and from there she came to Marblehead under her own power.

Mrs. Lucy R. Swanton, a prominent Washington club woman and wife of Walter I. Swanton, died at her home, 1464 Belmont Street, Washington, D. C., on July 21, 1933, after an eight weeks' illness. Mrs. Swanton was President of the Woman's Single Tax Club, Chairman of the Education Committee of the Columbia Heights Citizens' Association, and member of the Order of the Eastern Star, the Mount Pleasant Chapter of the W. C. T. U., and the Laymen's League of the Homeopathic Foundation. The Swantons were married in St. Louis in 1904. Mrs. Swanton is survived by her husband, who, like herself, is very active in civic affairs in Washington, and by their two daughters and son.

The following changes in address are noted: Dr. Augustus B. Wadsworth, 327 State Street, Albany, N. Y.; Cadwallader L. Washburn, The Moorelands, Livermore Falls, Maine; S. Edgar Whitaker, 25 Merriam Avenue, Bronxville, N. Y.— FREDERIC H. FAY, *Secretary*, 44 School Street, Boston, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston, Mass.

1894

Although relatively few items drift in to the Secretary during the summer months, there are a few regarding '94 men which it is of interest to present at this time.

Luther R. Nash, who has been associated with the Stone and Webster Corporation for more than a score of years, with headquarters in Boston, although his work took him to various parts of the country, has now removed to New York, with his office at 90 Broad Street. Nash is now in charge of the appraisal, valuation, and rate research work carried out by the Stone and Webster Engineering Corporation. He was formerly Engineering Manager for the Corporation, and later became manager of a number of the utility operating companies under Stone and Webster control. During all this time he studied the problems of public utilities and became an authoritative source of information on this subject. In more recent years he has especially studied the problems concerned with appraisal, valuation, and rates. For a number of years he has lectured in the Department of Economics at the Institute, especially on the subject of Public Utilities, and has given similar lectures at Harvard in the Business School.

Nash's studies on these subjects have resulted in two books which are very highly regarded by experts in the economics of public service corporations. The first of these was a book on "The Economics of Public Utilities," the first edition of which appeared in 1925, and a revised edition in 1931. This book is used as a text in a part of the work in the Department of Business and Engineering Administration. A second book which has appeared during the current year is entitled "Public Utility Rate Structures." The technical journals and engineering magazines have spoken highly in regard to both these volumes.

While we have seen Nash altogether too infrequently at our occasional reunions in Boston, those of us in this vicinity will regret his departure for New York but we trust that it will not interfere with his attendance at future class reunions. Our best wishes for his continued success, coupled with pride in his eminence in his field, will go with him in his new location.

The Secretary received during the summer a letter from Theodore Varney, the first in a number of years. Varney wrote from Nantucket, where he has a summer home, and expressed his intention of being in Boston for a desired conference with President Compton at some time during the late summer. Unfortunately the Secretary was away from the city at the time of Varney's visit to the Institute, for which he makes due apology to Ted, and hopes that the visit may be repeated. Varney has for many years been associated with the aluminum interests, for a long time with the Aluminum Company of America, at Pittsburgh, and more recently as consulting engineer for Aluminum Limited, with his office in New York.

The summer brought also a letter from Ray Price, written not from Paris, but from the Price Ranch at Los Alamos, in Santa Barbara County, Calif. This letter was in response to one from the Secretary regarding the invasion of Paris by a group of Course XV graduates, which is doubtless referred to elsewhere in The Review. It was the misfortune of the youngsters that they were not able to meet Price when they visited the French capital, but it happened that he and Mrs. Price were at the time on another world tour.

For many years Price had been very much interested in the political situations

1894 Continued

which followed the developments in Russia during, and immediately after, the war. On this trip he and Mrs. Price made a special study of the progress of communism along some of the southern frontiers of Russia and in other parts of the world. In his opinion the influences of the Third International are clearly visible throughout all the countries visited, and these included several in Europe, Asia, Africa, Australia, and New Zealand, as well as Colonial Dependencies in the South Seas. He also believes that the communistic influence is being felt to a considerable degree in our own country. Just what the outcome of all this activity will be is, in Price's opinion, beyond any human knowledge of today.

After the long, hard trip which they have taken, he and Mrs. Price are now making a stay of a few months on their ranch, which is in one of the most beautiful and restful parts of California. While he is in this country, it is certain that many of his classmates would be delighted to see again the Major of our Freshman Battalion, and the man who has taken such a prominent part in commercial and national affairs ever since leaving the Institute.

It is with very great regret that the Secretary announces the death of Leonard Williams Minot, who was associated with the class for two years in the Chemistry department, and who died on July 19, 1933. Minot spent most of his business life in Boston, and while he has never been especially interested in class affairs, we shall all feel deep regret that our numbers have been again reduced by his passing.

Let me call attention to the fact that next June marks the 40th anniversary of our graduation, and is the time for our five-year reunion. Suggestions as to how we should celebrate will be very gladly received. — SAMUEL C. PRESCOTT, *Secretary*, Room 10–405, M.I.T., Cambridge, Mass.

1895

Some class reunions evidently lead to other unions as was proved by the marriage of Lucile Defren, daughter of Mr. and Mrs. George Defren, of Newton, Mass., and Franklin A. Park, Jr., son of Mr. and Mrs. Franklin A. Park, of New York City, which took place at the home of the bride in Newton, on Thursday, September 7.

Members of our class who attended the Thirty-Fifth Reunion at Hotel Mayflower, Plymouth, Mass., in June, 1930, will remember that these young people met at this time. The couple will reside in Ann Arbor, Mich., where Mr. Park is a senior at the University of Michigan. This is another example of good team work displayed by the offspring of the members of the Class of '95.

Word has just been received of the passing of Margaret Cecelia Brawley, on May 4, 1932. Miss Brawley was registered as living at 6 Sachem Street, Roxbury, Mass. We regret sincerely to be compelled to make this record. Years are passing faster than we realize, so let us keep in mind the next five-year reunion, our fortieth, during June, 1935. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

Extra! John Rockwell, having now achieved his lifelong ambition, is content to sit back and watch the world go by. The reason for this is apparent from the story in the Boston *Transcript* of September 15, 1933. Those of us who go to reunions know that Rockwell, Fred Damon, and Joe Driscoll are keen on golf, and every year Joe goes South in the early spring to get his game in shape, and Fred likewise gets in all the practice he can. During the summertime they play together on various courses. On September 14 the three of them made up a foursome with Dr. John Cousens, President of Tufts College, and were playing on the Unicorn course. After the last three players had attempted to land the green on the uphill 145-yard sixteenth hole, Dr. Rockwell remarked: "Now I'll give you boys something to shoot for hereafter." Whereupon he smote the ball a mighty wallop. Straight up it flew and came down to hit the pin and drop, three feet away, into the cup for an ace! About a month ago Dr. Rockwell played this hole, well guarded by sandtraps; he visited every trap and just managed to escape two figures for the hole.

Harry Tozier, who has been located in Toronto with the Canadian Kodak Company for some time, reports that he is just the same as ever. He took a short motor trip at the beginning of the summer to the vicinity of Boston and up the coast, but he spent his time in Boston dining at the Parker House and looking at the underside of his car in the Cadillac service station. He went back home by way of Montreal, and it is his hope to be on hand at the next '96 reunion.

Sam Wise, whose death has been reported previously as occurring on July 1, was one of our lovable and faithful classmates, being one of the few who had a perfect record of attendance at reunions. He had been a resident of West Roxbury for over 20 years and had taken an active part in the community life of that section, including fraternal, civic, and church societies. He was a member of the Zepland Lodge and Royal Arch Chapter, First Parish Church of West Roxbury, The Layman's League, and the West Roxbury Citizen's Association. For a short time after graduation he followed civil engineering work, but entered the Second National Bank of Boston in November, 1897, and continued with that institution until his death. He was keenly interested in sports, such as tennis, golf, and bowling. He served in the Massachusetts State Guard from 1917 to 1919. In addition to his bank work, he carried on an insurance agency. He was born February 18, 1875, the son of Samuel H. and Adelaide M. Fernald Wise. He was married June 17, 1899, to Jessie L. Whittemore, who survives him. About three weeks before his death he went to the Massachusetts General Hospital for an operation, and was apparently progressing very nicely when a pulmonary embolism developed on the left side of the chest, so that it was decided it was necessary to remove parts of three ribs in order to get out the embolus. He passed away from shock during this operation.

Major Robert Samuel Hardy, who passed away on May 2, had made an enviable record in industry and engineering. He was born in Hampden, Maine, on December 4, 1873, and married on September 19, 1907, Mrs. Suzanne N. Cook. The early part of his work was in Utah, where he was first Assistant General Superintendent of the Utah Department of the Telluride Power Transmission Company, and later of the firm of Knight-Hardy Company of Provo, consulting engineers specializing in mining and real estate investments. He went to Los Angeles in 1904, where he became interested in real estate, and was also for several years with the Los Angeles Gas Company as construction superintendent. With the coming of the World War he enlisted, received the rank of captain and, after training at Fort Leavenworth, was sent to Buffalo, N. Y., promoted to the rank of major, and made director of Niagara Falls power distribution. After the Armistice he continued in the army until April, 1919, when he became Assistant General Manager of the Niagara, Lockport and Ontario Power Company at Buffalo, and Vice-President of subsidiary companies. He retired in 1926. Mrs. Hardy has written that it was June 10, seven years ago, when he was obliged to give up his work and go to Boston to be under the care of Dr. Joel E. Goldthwaite at the Corey Hill Hospital and Marblehead until November, when he was moved to California. He was able to get about a little until five years ago and take automobile rides, but for the past four years he was confined to bed with a man nurse in attendance, who lifted him once a day from the bed to the special chair. It was progressive lateral sclerosis. Mrs. Hardy says further that these were rich years for them all, years of service to one of God's noble men, the bravest of the brave. He never uttered a word of complaint and retained a keen interest in things up to within an hour of his passing, which occurred without warning. One of Hardy's great joys was his stepdaughter and his two grandchildren, who with his widow survive him. Although his sphere of action was outside of New England, he maintained his class interest and loyalty and had expressed a desire to meet old classmates at reunions.

Frank Goodman McCann was one of the men who made a strong impression on us, even as an undergraduate, by his firmness of character and persistency in carrying out his ideals. He was born in Chicago, September 25, 1871, the son of Henry Mackenzie and Fannie Carkner McCann. He married July 29, 1902, Miss Carrie Louise Dralle, and there was one son, Forbes Ellard McCann, of the New York University Department of Banking

1896 Continued

and Finance. While an undergraduate, he was with the Boston Blower Company on heat and ventilation design. For three years after graduation, he was with Evans, Almirall and Company, power and heating engineers and contractors. In 1899 he went with the Board of Education of the City of New York as Mechanical Draftsman, and from 1902 on as Chief of the Heating and Ventilating Division. He originated the use of standard details and of standard specifications for the work of school building and equipment. He was a member of the American Society of Mechanical Engineers and the American Society of Heating and Ventilating Engineers, having been on the Council of the latter in 1914 and 1915, and also President of its New York Chapter in 1912. He wrote various articles for trade journals and gave lectures on heating and ventilating to evening building trades classes in the College of the City of New York. His main interests after his business were church, reading, and study. He maintained his class interest, but never seemed to feel that he could break away from his business to meet with us. Incidentally, as indicating the humanitarian side of his life, he attended the Metropolitan College of Chiropractic, 1920–22, and received the degree of Doctor of Chiropractic. Charlie Lawrence, writing about McCann, says that his principles were so high that those who would advance their own interests with some compromise of conscience respected, feared, and hated him, according to degree. He was always sure of himself, and never afraid to declare himself. Lawrence's work in New York brought him in intimate contact with McCann.

In the last installment of the Fuller travelogue we had taken them across the Atlantic and left them in England. We now go on from there in their own words as follows:

"We left Liverpool on January 18 on our cruise around South America on the big British motor ship *Reina del Pacifico*, with nearly a full complement of English, German, French, and Spanish passengers, including a considerable sprinkling of nobility and of army officers. Sir Morris, the maker of the Morris automobile, known as the Ford of England, is one of them. Speaking casually to a man at my side, I found him to be A. W. Brightman of Fall River. He has made the same cruise nine times.

"The ship, finished in Colonial-Spanish style, is the most attractive of any of the hundred or more we have sailed on. The Diesel engines, with the low rows of giant cylinders like those of an automobile, but more nearly approaching a barrel in size, are an impressive sight.

"With England out of sight, fogs and sleet were left behind, and we began to forget our seven days of shivering in its unheated hotels.

"Our first stop was at La Rochelle, on the middle of the west coast of France. Dating from 1000 A.D., and once a possession of England, it was one of the most important ports of France during the colonization of America. From it sailed most of the ships to early Quebec and the Gaspé. Its harbor is still entered through a narrow passage between two ancient stone towers, once connected by an arch, and by chains hung at water level to prevent the entry of enemies during the long sieges at the time of the religious struggles between the Catholics and Protestants.

"Santander, on the north coast of Spain, was our second stop. It is a fine city nestling between the sea and the foothills of the Cantabrian Range, the westward continuation of the Pyrenees, with a summer palace of the former king. From it we drove 20 miles in a Buick car over a good asphalt road through beautiful rolling limestone hills to the world-famous Altamira Caves, perhaps the oldest known habitation of the human race, antedating by thousands of years the ruins of Egypt and Mesopotamia. From paintings on the walls, as well as carved bones, the caves are known to have been occupied when the bison and other animals, extinct since the glacial age from 20,000 to 40,000 years ago, roamed Europe. A fall of rock closed the caves before the ice disappeared from the north, preserving the paintings inside. Only in 1868 were they rediscovered.

"Coruna, at the northwest point of Spain, was our next port. Dating from Phoenician times, it was an important port of Spain until its trade ceased with the loss of Cuba and Puerto Rico. From it, the Armada sailed against England in 1588. Its people called it the Crystal City from the glass fronts of many of its large buildings. Our final stop in Spain was at Vigo, on a fiord-like inlet extending 19 miles into the limestone mountains just north of the Portuguese boundary. It has been the scene of many treasure hunts since 1702 when a gold-laden Spanish fleet was sunk by the British and Dutch.

"A few days at sea brought us to the Canary Islands, belonging to Spain, and lying off the African coast. From Las Palmas, the largest of all Spanish ports and a great oil and coaling station, we drove again in an American Buick for many miles along the big lava cliffs facing the sea and far up among its volcanic hills, passing several craters and ragged lava flows. So steep are the slopes, that large numbers of the dwellings are excavated in the soft rock instead of being built in the usual way on the surface. Many date back to prehistoric times, and in them have been found large numbers of human bones and mummies. The exteriors of the modern cave-dwellings are often neatly painted, with vines and small gardens in front. The interiors are whitewashed and neatly furnished.

"Leaving the Canaries, our ship passed through the arid, rugged Cape Verde Islands, with towering volcanic peaks and yawning ravines, sometimes thousands of feet deep.

"Beyond, our way led southwestward toward South America along one of the airplane routes to Brazil. Approaching the equator, the temperature jumped from 75° to 85°, but the fresh southeast trade winds kept us fairly comfortable. Neptune paid his usual visit, lathering, shaving, and throwing into the swimming tank those who had not before crossed the line. We had crossed a dozen times or more, and so escaped. As usual the ceremony ended in a 'rough house' in which even Neptune himself was thrown into the tank.

"South of the equator, we passed close to the Brazilian convict settlement on the island of Fernando Narohna, sometimes a stopping place of airplanes crossing the Atlantic. It is remarkable for a peak, rising needle-like to 1,000 feet, and for a great natural arch through a rocky point.

"Today we are running along the Brazilian coast south of Pernambuco at a distance of 50 miles, but with the land invisible. Morning will find us at Bahia, our first port in South America."—CHARLES E. LOCKE, *Secretary*, Room 8–109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1900

Harry Grant has terminated on a retirement basis his 30-year association with the Graybar–Western Electric, according to the news contained in a recent letter to Stanley Fitch. Grant is setting up in Washington, D. C., on his own account to serve as a consultant for manufacturers and distributors, who are operating without representation in Washington. His business is to assist in matters of general information, developments of interest, rulings of the Bureaus, interpretations of the Statutes, sales coöperation, analysis of claims, adjustments with the Bureaus, collection difficulties, and so on. The last four years of his activities have been at the Capitol City and he is well qualified to establish himself in this new field.

George H. Mead, President of the Mead Pulp and Paper Company of Dayton, Ohio, in Washington, September 14, speaking for the Committee which framed the code, commented that the pulp and paper industry was one of the small communities, mostly rural, and that there was an unusually cordial relationship between labor and employers. The industry is mostly "open shop" but many are unionized. He explained that the "merit" clause, which was put into the automobile code and has caused so much opposition from unions, was eliminated from the pulp and paper codes, by agreement with labor, before the hearing. This illustrates the kindly spirit in the industry, he said.

He defended the zone wage differentials, saying they had been kept as low as possible. He also defended the sex differential, saying that if there were no differential, women would lose the "light" jobs they now have in the industry. He said the differentials compared favorably with zone differentials in other industries. The code specifies "equal pay for equal work."

He defended the wage rates on the ground that if they were raised too high, the industry would shut down, which

1900 Continued

would defeat the purpose of the code to increase employment. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

I am on the eve of leaving my hilltop to resume the winter's contact with the larger world, but pause in my Martha-like duties of house-closing to pen — literally — these lines of greeting and good will. In the meantime, and despite the parsimony of our Alma Mater, to which I paid due tribute in my last letter, reports have been arriving daily from those who either met the postage due or were taken care of in the second sending. And they bring glad tidings.

Ellis Lawrence, always one of the faithful, sends a particularly newsome screed. Ellis, as you will remember, is the senior member of Lawrence, Holford (Bill, the Boy Scout) and Allyn. (I suspect A. W. of the unworthy class of 1902, but am not sure.) He is also Dean of Fine Arts of the Oregon System of Higher Education. This latter embraces architecture, both legitimate and landscape, interior decorating, painting, sculpture, music, and yet other human activities which for very shame I will not name. Dimly to my mind comes the fact — or rumor — that Oregon has Hooverized their educational program with results that could have been anticipated. The above allusion, for those who date from the new deal, is to a temporarily well-known Californian, a neighbor of Ellis's as it were, for in the expansive West distance has lost its meaning. There is also a report of a variety of civic, state, and national activities — Ellis is a good citizen — which I pass over hurriedly to come to the most zestful item of the category. I give it in his own Lardnerian prose. "The Prize Fight! I felt it necessary to attend, as Ah Wing Lee, the big show, was a student of mine in architecture." I hope this catches the eye of our William Emerson. There is food for thought here, and as an expert, I have always felt that the members of Course IV were too prone to invoke the lumberjack's technique in adjusting their personal differences. I return to Ellis — "It was a good fight. My training showed up as the Chinaboy got his man in the fourth round." Now doesn't that moisten the lips and gladden the heart? And I'll bet he had a ringside seat as a *loco* for a vicarious *parentis*. (This will not get by the editorial eye. You will probably be offered a row of stars.) Ellis and a son, also and on another occasion, caught 48 trout between them. His discretion forbade an allocation of individual responsibility. I am writing him to suggest that he and the Boy Scout come on for the 32nd Class Reunion to be held at the end of the 33rd year. "*Vingt ans après.*"

Lammot du Pont writes in "as before." If one may judge by the daily press, this may be so, but there is certainly more of it. Matt Brush is another "as before"-er and with the same emendation, while Farnum Dorsey, with characteristic caution, refuses to commit himself even so far and sends only his name, and, God bless him, a small and welcome check as did the others, and yet others, to whom be Peace and Salutation. I say it with bated breath, but for the moment the Class is solvent and those of you who paid the postage due learned earlier in the summer that, thanks to my prudent administration, we entered a new fiscal year with money, not in the bank but in a safe place. There was some talk of my taking over Sec'y Woodin's job when this became public, but we both felt that he had better stick to his music.

A note from Fred Clapp, of whom more later, states that he has been abroad — of course — and has seen no '01 men. That's odd, for LeBosquet must have used up this country long ago and then we have Enouye in Osaka and Denny Haley in Aroa, Venezuela, to name but a few of the many. In glancing over the list of foreign students, my heart was smote, or smitten, with grief that the surprised youth with the Carrollian patronymic of Oh and who lives in the jocund suburb, Hei Jo — accent on the high — was born 26 years too late to be a member of our class. How one could ring the changes. (Secretary of 1927 please note. Will you lend him to us?)

Well, twilight is falling on bonny Lock Leven and I've work calling me. So, rest you merry, gentlemen, and all those who are trying to reconcile the official statement that a depreciated dollar will buy more goods when the price of them is higher. How that must make our premier rationalist, D. R. Dewey, writhe. By the way, did you ever see a hoop snake? It's the same thing. Remember that I am still living within the kindly shadow of a well-known Lincolnshire saint. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

Miss Alpa Whitney, daughter of Professor Philip R. Whitney of the University of Pennsylvania, was married on the 24th of June to Mr. Bernard H. Shelton. The wedding was at the Whitney home, Stepping Stones, Moylan, Pa. — Mr. and Mrs. James H. Browne of Beverly Hills, Calif., landed in New York early in June from a tour around the World.

Our two representatives in the student body at Technology, Wendell Fitch and Alice Hunter, have duly progressed into the sophomore class. Fitch is taking Course X and Miss Hunter is taking Course V. Both worked in the Chemistry Laboratories part of the past summer in a small group who tried out a new set of experiments to be used with the incoming freshmen.

During the summer we learned of the death of George A. Worden in an automobile accident in Gloucester, Mass., two years ago. Worden, who was a student at Tech during a portion of our years was for many years a mechanical engineer for the Solvay Process Company in Detroit. For about ten years he had been a resident of Gloucester, where he had spent the summer for several years previous. Worden was married in 1905 to Olive R. Moody and had one son, George Moody Worden. — Walter Havens Farmer died of pneumonia on September 19 at his home at Rye, N. Y. The next issue of The Review will contain an account of Farmer's career. — FREDERICK H. HUNTER *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1904

As you are all probably aware, since the last issue of the Review the N.R.A. has gone into effect. I have heard various and sundry meanings ascribed to the magic initials N.R.A. From my personal experience as Secretary of the Class, the meaning seems to be "No Reports Anywhere."

However, acting under the code for class secretaries, I have been able to put together the following items of interest to the class members without working more than 40 hours in any one week.

Under date of May 29, I received a letter from Gus Munster enclosing the following clipping under the heading "Who's Who in Quincy Scouting."

"Charles L. Homer, former commissioner of the local Boy Scout Council and at present a member of the Advisory Board, has been actively associated in scouting for the past 15 years.

"He has been a member of the troop committee of Troop 5 for that entire period, was scoutmaster for two years and commissioner for 12, serving in that capacity longer than any other man in Quincy. He was then made Vice-President of the Council for a year and is now on the Advisory Board. Practically his only interest outside of his home is devoted to aiding the local scouts.

"He was born in Galveston, Texas, and has lived in Quincy since 1903. He has always been active in civic, social, and church affairs, although he has never attempted to enter public life.

"He has been a member of the Kiwanis Club, the Neighborhood Club, and the First Parish Church.

"He lives at 76 Presidents Lane with his wife and daughter, Miss Alice Homer. Mrs. Homer was a former President of the Quincy Women's Club and the founder of the Quincy Women's Club juniors. Miss Homer is a past President of the Junior Welfare League and is an amateur actress of distinction, having formerly been connected with the E. E. Clive players."

The clipping was accompanied by a more or less dull and indistinct picture of Charlie. It shows the famous Homer smile, but inserted in one corner of it was a large black pipe which he seemed to be enjoying to the utmost.

Charlie is now employed by the U. S. Government as an inspector connected with the activities of the N.R.A. He is located somewhere in Georgia. As I recall my conversation with him, he is engaged in overseeing certain trades so that the provisions of the N.R.A. codes may not be violated.

1904 Continued

In the last issue of the class notes the statement was made that the Annual Reunion of the Class was held on June 24, 25, and 26. Of course, that statement was made prior to the holding of the Reunion, but nevertheless it was a true statement. The Reunion was held on those dates at East Bay Lodge, Osterville, and was the usual success, although the attendance was quite small. There were no special occurrences happening, but those present enjoyed the usual good time. The boys attending were Hump Haley, Mert Emerson, Cy Ferris, Ed Parker, Gus Munster, Jack Draper, Gene Russell, Bob Dennie, and myself.

Professor Locke is responsible for the two following items! S. Skowronski returned from Chile on May 3 and is back again at his work with the Raritan Copper Works, Perth Amboy, N. J. Guy C. Riddell left New York on April 8 for Europe to examine lead and bauxite properties. He expects to return in June. Riddell is probably the most traveled man in the class, according to reports which Professor Locke sends me from time to time.

A clipping from the New York *Sun* of July 12 indicates that one of our class members has been doing his best to bring about the acceptance of a code in the coal mining industry. How the results of the battling may have come out is not known to me.

"In this corner George B. Harrington for the operators, and in this corner Philip Murray for the miners. The card would indicate some stiff battling before the Industrial Recovery Administration gets a no-decision coal mining code. Mr. Harrington, the poised Princetonian, and Mr. Murray, the militant miner, Vice-President of the United Mine Workers of America, have met many times before, with their differences just as soluble as a chunk of slag.

"Mr. Harrington, born in Wilmington, Del., went to the Massachusetts Institute of Technology, after finishing at Princeton, and then engaged in engineering and coal mining in Mexico and the Far West. Since 1914 he has been in Chicago, general manager of the Wilmington and Franklin Coal Company.

"Mr. Murray, seasoned labor battler as he is, has been a useful conciliator at times, having been called in by President Harding with Brig.-Gen. Bandholtz, to quiet the West Virginia coal disturbances in 1922. He moved up through union labor ranks."

It is my sad duty to record the death of Elizabeth, oldest daughter of Mert Emerson, who passed away last August after a brief illness. The sympathy of the Class goes out to Mert in his loss. Her funeral was attended by a number of classmates who acted as pall bearers.

Ed Parker recently resigned his position as Federal Bank Examiner after holding the position for the past 17 years. Ed has always been connected with the banking industry, having spent the first 12 years after graduation in various banking institutions in Boston. In 1916 he became one of the Federal Bank Examiners and has continued there until the present time. He has been elected President of the National Bank in Reading, Mass., so he still continues his interest in the banking business.

A clipping from the Boston *Herald* of September 15 gives us some information about our best-known class member, Mert Emerson.

"Merton L. Emerson, Boston industrial and construction engineer, was today appointed a member of the federal government's technical board of review, it was announced yesterday from Washington.

"Emerson, who was graduated from the Massachusetts Institute of Technology in 1904 and who served as a major in the Chemical Corps during the World War, is a former President of the Lamson Company and the American Pneumatic Service Company.

"In 1919 he was selected to direct the $10,000,000 Endowment Fund for Technology. He is a member of the Engineers' Club of Boston, the chamber of commerce, the Engineers' Club of New York, the Business Men's League of St. Louis, the Chicago Association of Commerce, and the Rotary Club."

The foregoing are all the items of news which have come to my attention and I hope that I shall have more to set before you in the next issue. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3305-18th Street, N.W., Washington, D. C.

1905

The Assistant Secretary is still in office and the office is still at 20 Newbury Street, Boston, in spite of the wind-up of the July notes.

Fred Pirie, II, wrote in May: "Your welcome letter was received some time ago and some of the references therein awakened many memories of the past. At the Alumni Banquet I had a chat with Mr. Lambirth who addressed me as 'Paddy' — a name wished on me by Johnny Coleman (of ballet fame) and which I had nearly forgotten.

"The Saturday night 'Kommers' (note the spelling) [we prefer 'Commers', Sec. '05] were always enjoyable affairs and what a stir was created when it was announced that beer was to be served; it gave Tech nearly as much notoriety as the Copley Square Riot. As yours truly had no fondness for beer, he and some others of the same high standard of taste would arrive on the scene sufficiently fortified to carry us through the evening, and incidentally, what a free lunch the old Lenox served in those days — even to linen napkins.

"Frederick Field Bullard was a fairly regular attendant and he and Jim Barnes, VI, vied with each other on the singing end of the entertainment. I wonder if Jim can recall a song about the 'Shades of Izaak Walton'. The old Show rehearsals were a lot of fun, and how we had to plug on the 19th of April with an all-day rehearsal. It would be a treat now to see some of you old boys trying to go through a ballet or pirouette across the stage dressed up to resemble (?) a young dame." [We can do it, Sec.]

Fred and the 60-odd members of the class who, at one time or other, participated in Tech Show and who mourned its death a year or two ago will be glad to know more of the revival than was told in the brief account in the July Review.

From Cambridge it was learned that two juniors, who had been in the Show, thought that it could be brought back to life, convinced the Institute Committee, and went at it. "Fancy That" was run for three nights in the gymnasium of Walker to an audience that totaled 1,200, on a total budget of $1,100, with a net profit of $150.

The students and faculty supported the Show in good fashion, stimulated considerable interest, and the final result is that Tech Show has again been approved by the Institute Committee as a Class-A activity. There was no attempt to go outside of Boston or to notify alumni, even in and around the city, but solely to interest the student body. The new board has already started work on the show for 1934, to be run on the same modest scale in Walker gymnasium and, from all indications, should be even more successful than this year's Show.

From Carl Humphrey, I, Dean of the School of Technology, Villanova College: "I have been subpœnaed to appear at the Commencement of La Salle College, in Philadelphia, on June 7 next, prepared to receive an honorary Sc.D. (In the Spring an old man's fancy fondly turns to LL.D.'s, but I guess we all like a little applesauce.)

"Another portion of the same confection is that the student body have dedicated this year's issue of their college annual, the *Belle Aire*, to me. As for things in general, what old Soloman said goes, *Nihil Novis Sub Sole.*, which, as Mister Dooley would say, 'is a hill of a mane thing to say of iny man'."

And along these lines, Professor Locke informs that "Professor Joseph Daniels, III, of the University of Washington at Seattle, delivered a paper on June 16 before the Fifth Pacific Science Congress at Vancouver. The subject was 'Coal versus Electricity as a source of Electric Power.' He also received the degree of Engineer of Mines at Lehigh University this year. He submitted a thesis dealing with the coking coals and the possibilities of establishing a by-product coking industry."

John Damon, VI, telephoned one Friday in July from Waterbury where he was on a job. He came over and spent two nights and we had a chance to get quite well acquainted. Together we enjoyed a swim in the Sound. Incidentally, after several years' effort, your Secretary thinks that he has made some headway with the crawl. Only a four-beat, six-beat just won't syncopate, but our severest critic says that we are beginning to look like a swimmer.

This is no challenge to such experts as Bob Lord, X, and Sid Strickland, IV,

1905 Continued

(we recall no others at Duxbury, Marion, or Oyster Harbors) but it helps to prove that life really does begin at 40.

Bob Luce, I, is now rated Commander in the U. S. Coast and Geodetic Survey. The address is still Manila. — City Manager Jim Barlow, I, entertained Flyer Amy Mollison at a luncheon in Portland on August 25. — According to the '07 notes, tourists are now visiting the San Blas white Indians that Dick Marsh, I, discovered in Panama ten years or so ago. — Charlie Smart, II, is President of the Technology Club of Albany.

It was a pleasure to have a young man walk up to your Secretary's cottage in Center Harbor, N. H., and introduce himself as Bayard Jones (son of George, II). In the same town, a new acquaintance turned out to be a resident of Franklin, Mass., and a friend of Prince Crowell, X. In fact, he had just come from Prince's 25th Reunion — or is it Anniversary? — Ray Bell's, II, office is now at 205 East 42nd Street, New York.

For a year or so, Sid Strickland, IV, and his son, Charles, have been working on the restoration of a section of Plymouth, where Sid has long spent his summers. The houses on Summer Street, the third street to be built in Plymouth, have been, one by one, restored to as nearly as possible their original condition. Judging by the photographs which appeared in the *Transcript*, the results are most attractive, which is not surprising as Sid has had much experience in the restoration of early houses and the building of new houses in the old spirit.

Strangely, the start of the work involved no sentiment, the owners being induced to undertake the project on the basis of sound economics. As one house was finished and occupied, others were started. This appeals to us as particularly praiseworthy and we congratulate Sid and Plymouth in carrying it through.

Three classmates have passed away this summer: Leo J. Devlin, IV, on May 11, Elmo C. Lowe, IV, on June 11 and William H. Warnock, I, on June 18.

Devlin was with us only the senior year, returning to his home, San Francisco, where he practiced his profession until forced to retire by ill health about 1930.

Lowe attended the University of Chicago and took his last two years at Tech. Upon graduation he entered the office of Cram, Goodhue and Ferguson but soon returned to his home, Chicago, and formed the partnership of Lowe and Bollenbacher, which had a good deal to do with the newer buildings of Northwestern University at Evanston.

Lowe was nationally known as a designer of churches, some of which are located in Chicago, St. Louis, Kansas City, Cincinnati, Gary, Berwyn, and elsewhere. During the War he served overseas as a Y. M. C. A. secretary. For years he had been on the Evanston City Planning Commission and had been an officer of the Chicago chapter of the American Institute of Architects of which, in 1930, he became a Fellow.

A Chicago alumnus writes that "to know him was to like him, for he had a charming personality and many of us will regard his loss as personal. Dependable, reliable, and a good citizen. We will not forget him."

Warnock was for some years with the Board of Water Supply of New York City, at one time being in charge of the Catskill Aqueduct from 59th Street to 14th Street. During the War, he was a construction engineer with the Corps of Engineers, in charge of construction at Newport News, Va.

About 1920 he became City Engineer of Montclair, N. J., a position he held at the time of his death. He left a wife and three children. — ROSWELL DAVIS, *Secretary*, Wes Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1906

Each day brings fresh reminders that the fall season is approaching. The first sign of fall comes in the form of a notice that notes are due for the November issue of The Review. The Secretary has not heard from many members of the class during the summer months; we have a few items, however, which we will submit at this time.

Classmates will be sorry to hear that Ned and Mrs. Rowe suffered the loss of their only daughter, Esther Howlett Rowe, who died Sunday, September 3, at the Newton (Mass.) Hospital as the result of a ruptured appendix. Esther would have been 15 years old on September 25. She was interested in Girl Scouting and it so happened that this past summer she attended Scout Camp, "Four Winds," near Plymouth, Mass. It also happened while she was there, that there were three other '06 men who had daughters at the same camp; namely, George Guernsey, Perley Griffin, and the Secretary. Besides her father and mother, Esther is survived by an older brother, who is in the Class of 1936 at Technology, studying naval architecture. The entire class will sympathize with Ned and Mrs. Rowe in their loss.

Professor Locke advised that Clifford R. Wilfley, of Denver, has been engaged as a consulting engineer by the Hawkeye-Bimetallist Company, planning to develop properties in the Sneffles district near Ouray, Colo.

Early in September the Secretary had occasion to visit his dentist who has an office on Newbury Street, directly behind the Rogers Building. While there, who should drop in but our old friend, Dean Burton, who seemed to be in excellent health and spirits. The Dean is now living at 12 T Wharf, Boston, with an older sister who is an artist. He has a son who is an architect in Boston; also two daughters who at one time lived on the Pacific Coast, where the Dean spent some time with them, but who have since married Easterners and now live in this part of the country. The Dean gave every indication of living a very happy existence.

Received a telephone call from Ralph Clarke the other night who asked me to hold the line a moment. The next voice sounded strangely familiar and sure enough I guessed right the first time, it being none other than our old friend, Steward Coey. Steward happened to make a business trip to Boston. On replying to my plea for class news, he advised that his second son is entering Amherst College this fall. He modestly intimated that said son is quite an athlete. For further information, I suggest you follow the doings of the Class of 1937 at Amherst. — Speaking of 1937, the Kidder family have just seen their only son, Norton, enter the Class of 1937 at Harvard. The Secretary hoped Norton might go to Tech, but his preparatory school work and his inclinations decreed otherwise.

A perusal of the sporting pages of the Boston Sunday papers gives us a line on one or two of the classmates. Ralph Patch still plays golf and succeeded in getting a prize at the September tournament of the University Club which, I believe, is a case of history repeating itself. Frank Benham's name is frequently found in the results of the golf tournaments at Winchester and the yachting news from Marblehead shows that Joe Santry has been indulging in his favorite sport this past summer.

It may occur to the reader that these notes are mostly concerned with the children of classmates, but when news is scarce from our own generation, items concerning the next generation should be of interest. — J. W. KIDDER, *Secretary*, Room 1001, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

The Secretary reports that not a single item of news has been received from any member of the class in the past month and he has been unable to dig up anything. He hopes for better luck next time. — BRYANT NICHOLS, *Secretary*, 12 Newland Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

This is the first chance we have had for telling you the news since May, 1933, B.R. B.R.? — before reunion, of course. Well, it was a great success as every 25th should be. Those who were there will agree, and those who couldn't make it have probably heard about it from some of those present. We missed the "absent brothers" and hope they make the 30th. Well, the reunion started Thursday evening, June 15, with an informal dinner at the University Club in Boston. George Glover, Chairman of the Reunion Committee, was master of ceremonies, ably supported by Hobe Ferris and Burt Cary as assistant toastmasters.

A good many of the boys hadn't been back to a reunion since 1908 so there was plenty to talk about and many forgotten

1908 Continued

undergraduate times to bring to life. Looking around the table, one couldn't help thinking what a young-looking crowd it was, more like a lot of "five-year outs" rather than sedate "25-year outs." While there are probably some grandfathers among us, the supply of hair was still abundant (in most cases) and the "pleasingly plumps" were certainly scarce.

The dinner was a genuine success and while we didn't sing about it, the stein was on the table again, and it didn't seem so long ago to the good old days at "Charlie's" and "Chapel." We had planned to go down to the Cape Thursday night, but after a good dinner and plenty of talk, the Cape seemed a long ways off on a dark night. As a result we started Friday morning by motor and most of the crowd was registered at the Oyster Harbor Club in time for lunch. There were no set plans of procedure. You could golf, swim, play tennis, motor, or just "set". I shouldn't forget that it developed we had some very expert bridge players of the contract variety who staged a pretty near continuous performance.

As to golfers, we may not have any "Bobbie Jones's," but as George Glover remarked, some of the boys certainly "dressed" a good game. The weather was pretty fair, with an occasional shower to cool off the golfers who were getting overheated.

Saturday night we had the Grand Banquet served in the Grill Room where we could make all the noise possible, and the way the "regular '08" and "Are We Happy" were rendered indicated plenty of pep in '08 still. Did you ever hear a grand opera rehearsal? Well, we had some of that, too. Leo Loeb and Ferdy were partly responsible for the recovered youth, as the libations which they supplied made even "the little woodchuck roar" to say nothing of the "lion."

The crowd began to break up on Sunday which was a perfect day, and it seemed too bad it was all over. By the way, we sandwiched in a class meeting and George read some interesting letters from some of the boys who couldn't attend. It was voted to have George chairman of the Thirtieth Reunion and all get together and work to make the reunion in 1938 bigger and better than ever.

The following attended the reunion: Bill Barton, Albany; George Belcher, Waban; Bill Booth, Foxboro; Claude Brown, New York; Jimmy Burch, Debuque; Nick Carter, Waban; Burt Cary, Winchester; Lang Coffin, Newton; Fred Cole, Newtonville; Herb Cole, Boston; Tim Collins, Newtonville; Dick Collins, Newton Highlands; Alton Cook, Chestnut Hill; Ray Drake, Brockton; Henry Dunn, New York; Toot Ellis, Melrose; Paul Esten, Stoughton; Amedeo Ferrandi, Dorchester; Hobe Ferris, Akron; George Freethy, Watertown; George Glover, Lima; Sam Hatch, Watertown; Ted Joy, Milton; Stiles Kedy, Melrose; George Lees, Pottstown; Harold Locke, Bryn Mawr; Leo Loeb, New York; Steve Lyon, Providence; Jim McGowan, Camden; Spike McGuigan, Newark; Linc Mayo, Brookline; Harry Putnam, New York; John Reyburn, Fairfield; Ray Sewell, Hyde Park; Bill Taylor, Corning; Frank Towle, West Roxbury; Chan Turner, Boston; Kurt Vonnegut, Indianapolis; Al Weeks, South Dartmouth; Harold Weeks, Brooklyn; Clarence Clark, Everett; Lynn Goodman, Brookline; Bill Medlicott, Auburndale; Paul Norton Wellesley. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1909

Molly Scharff sends the following "Class Notes About the Summer's Traveling Around":

"A few weeks ago I met Eugene Luening on the train going to Pittsburgh and enjoyed talking over old times with him. He looks well and appears prosperous, apparently being engaged in some branch of chemical manufacture in Louisville, Ky.

On the boat going up to Yarmouth, N. S., for a short vacation last month I ran into F. G. Perry, who apparently spends a good part of his time looking after a pulp mill in the vicinity of Halifax, N. S., for the Babson organization.

Returning a week later on the boat from St. Johns, N. B., to Boston, I met Mr. and Mrs. John Willard and we had a nice visit together. — I met Max Weill on the subway the other day just after he had returned from a vacation at Rangeley Lakes, Me."

Allen Jones is with the Muscogee Mfg. Co., Columbus, Ga. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, Main and Company, 1 Wall Street, New York, N. Y.

1910

Our classmates do not seem to be in a writing mood this month. In spite of the Secretary's appeals for letters, only one has appeared. If you get a letter from the Secretary, be sure to jot down something and mail it in and be sure that your news will be welcome, whatever it may be.

Petit, IV, who is Vice-President in charge of sales of the Indiana Limestone Company, writes: "I wish I could contribute something of more than passing interest to your notes for The Review. The Indiana Limestone industry naturally affords a great deal of interest to Course IV students and it has been a great pleasure these last three or four years to come in contact again with men whom I knew at M. I. T. and those who took architecture both before and after my time.

"I am sure also that the quarrying and fabricating of this material would be interesting to the engineers of Tech. Unfortunately, the deposit is off the beaten trail and consequently difficult to reach, but should any M. I. T. man find himself in this neighborhood, I shall be delighted to show him around even though activity at the present time is considerably curtailed." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

Practically coincidental with the dispatching of these notes, your Secretary is embarking on what has come to be one of his most enjoyable week-ends each year — to Camp Massapoag, Dunstable, Mass., to participate in the Annual Sub-Freshman Camp, conducted by the Technology Christian Association over the three-day week-end just preceding the opening of the Institute year. There it is my privilege to teach the youngsters Technology songs and cheers and otherwise assist in inculcating them with the extra-curricula opportunities that are theirs to obtain.

With no details available, we are advised by Professor Charles E. Locke of the Mining Department that our classmate, Archie Orem, III, formerly of A. J. Orem and Company, Salt Lake City, was killed in an automobile accident this summer.

Jim Nealey, I, of the staff of the American Gas Association, New York City, has moved from Jackson Heights, N. Y., to Hurlburtt Road, Wilton, Conn. — Stu Copeland, II, of Eastern Manufacturing Company, Bangor, Maine, and Vice-President of the National Pulp and Paper Association, took an active part in the Code hearings of that industry in Washington on September 14. — A week earlier a chamber music concert, art exhibit, and tea, for the benefit of the New England Deaconess Hospital, was given at River House, the summer estate of Bill Coburn, I, and his wife, located at Norton's Point, Manchester, Mass.

On the 18th of September, while attending the annual Golf Tournament for New England hotel men and purveyors, conducted by Hotel and Travel News, this year at Poland Springs, it was a delight to find among the purveyors present Ken Faunce, VI, with John C. Paige and Company, Boston, and Hal Manson, '10, Vice-President of Rival Foods, Inc., Cambridge. All three of us played the 18-hole course on a perfect day; the scores: Manson, 48+48=96; Denison, 50+47=97; Faunce, 55+64=119. Hal won fourth best net among the purveyors and your Secretary won fifth best net among the hotel men.

At this point readers will say: "Is that all that 1911 has this month?" The fault is *yours*, Mr. Classmate. Write to Dennie! — ORVILLE B. DENISON, *Secretary*, Douglas Hill Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

It has been our privilege to read some of the letters and bulletins which Professor E. H. Schell, II, has written from time to time for students and also graduates of the splendid course he is conducting at the Institute. For Schell doesn't forget his boys after they leave the gray buildings on the Charles. He is constantly

1912 Continued

corresponding with them, helping them, encouraging them. It happens that your Assistant Secretary has had one of these younger graduates with him for several years, and if he is anything like a fair sample of the product of Course XV, then Schell is certainly doing a beautiful job. During the past summer months, Schell had quite an extensive trip through Europe and after a little urging we prevailed upon him to write us about it. Here is what he says:

"I fear this may be too late for you, but I am getting to the bottom of my mail which has been accumulating this summer. On June 10, my family and myself embarked for Boulogne in the wake of a dozen exuberant students who were undertaking a European industrial tour. My mission was chiefly that of advance agent and general *factotum* in the establishing of the necessary industrial contacts. The route lay from Paris to Brussels, Amsterdam, Cologne, Berlin, Dresden, Prague, Vienna, Munich, Venice, Milan, Geneva, and then back to Paris and the boat.

"The family originally had planned to remain in Paris for a period and then follow the Rhine from Holland to its headwaters and await me in Switzerland. A few days on French soil convinced them that I should require a constant bodyguard so we went the rounds together. The students traveled via motor bus and we contacted them in the large cities and arranged the itineraries of visitations.

"Despite some initial misgivings, we encountered no difficulties in any of the countries visited. Indeed, our greatest problem was to withstand the deluge of hospitality which student organizations extended to us, upon hearing of our oncoming.

"We returned with a feeling of real optimism for the future of Europe in the light of the intelligent and determined efforts which each country was making to surmount its difficulties."

E. B. Moore, VI, paid us a recent and very welcome visit. Moore is with the Vulcan Electric Company with offices at 225 Varick Street, New York City. He represents that organization as sales engineer in charge of the territory covering the Manhattan and Bronx sections of New York.

E. W. Davis, VI, Chief Electrical Engineer of Simplex Wire and Cable Company, Cambridge, Mass., has been elected President of the Insulated Power Cable Engineers Association. Robert J. Wiseman, VI, of the Okonite Company, Passaic, N. J., was re-elected Secretary-Treasurer. This is an engineering association composed of representatives of the various power cable manufacturers in this country.

A. C. Albee, I, visited with Vernon G. (Doc.) Sloan, I, while on his vacation last summer. (We'll bet a lot of old Course I stuff was hashed over that week!) Albee has been in the engineering department of the Erie Railroad for several years, and is now located at the Cleveland headquarters of that organization. He feels that this N.R.A. business is going to help things generally, and that the railroad companies are already feeling the improvement in freight traffic. Like some of the rest of us, however, he wonders just where the white collar man, and especially the engineers, are going to end up. With big pay cuts and salary slashes behind them, they now face a rapidly rising cost of living which has already had about the same effect as another pay cut of about 20%. Albee's home address is 2257 Briarwood Road, Cleveland Heights, Ohio.

From P. T. Redfern, IV, a few grim lines, which, with a few revisions and deletions of our own read as follows: "The construction business is about at its lowest ebb. It couldn't be much lower, so any move has to be up. Fighting the depression is no longer new and it's far from interesting. I really haven't any news that's fit to print in the Class Notes. Haven't seen or heard from any of the gang lately." — Why wouldn't it be a good idea for somebody to write to Redfern? He is Sales Manager of the Byers Machine Company, Ravenna, Ohio. Of course if you want to include with your letter, an order for a dozen assorted power shovels and cranes, he'd be glad to handle the matter for you. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. MCGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1914

Just one solitary news item has come to your Secretary's attention during the past month and that was about our versatile member, Porter Adams. Pat has developed a new type of wind-tunnel lift arrangement which makes it practical to determine wind resistance effects on all types of motorized vehicles, from locomotives to airships. This device has been worked out between Adams's many other duties, which range from law making for the State of Vermont to directing the Executive Committee of the National Aeronautic Association in Washington.

Speaking of inventions reminds us that we have in our class a man whose research work is having a very important influence on the development of building material finishes. F. C. Atwood, as Vice-President of the Atlantic Research Corporation, has developed new paints and plasters with very novel qualities. One of the recent developments is an acoustical plaster which is put on in much the usual manner but when dry gives the room the equivalent of a very heavy acoustical treatment. Uncle Sam's Post Office Department has just purchased about 200 tons of this new material for its new Washington Post Office Building.

Have you sent your reunion idea letter to President Dorrance or to your Secretary? If not, please do so this week, as the more time that can be had to complete the reunion plans the better the reunion will be. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, L. I., N. Y.

1916

When in New York yesterday, I was more than shocked to hear of the serious automobile accident in which Steve Brophy was involved on September 16. The accident occurred during the severe rainstorm which resulted in a hurricane striking the Carolina coast. A truck ran into Steve's automobile, throwing him underneath the car and as the gasoline tank was fractured he became completely saturated with gasoline. His clothes became ignited and before the flames could be extinguished he was very severely burned practically all over his body. He is fortunate to be alive and it is expected that he will be in the hospital for some little time.

Bill Farthing also was involved in a recent automobile accident but I was unable to obtain details. I was glad to hear, however, the accident was not a serious one and Bill is now up and around as usual.

Jack Burbank has recently been elected to the presidency of the New York Alumni Association. More *honor to the glorious Class of 1916*.

Your Secretary has found the summer all too short with the usual business activity and, of course, the necessary time out to perfect his game of golf. Suffice it to say that our golf volume has been over 60% ahead of last season and I can now boast averaging in the middle 90's. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

Once again a letter from Allan Winter Rowe '01 has reached us giving many cogent reasons why the Class should contribute to the Alumni Athletic Fund. With these reasons we are compelled to agree, but our Treasurer does not find himself overstocked with funds. I assume that he would welcome any unsolicited contribution that might be sent him marked for this especially worthy purpose.

On a visit to Chicago to see the Fair and for one or two other similarly important purposes, I met at an M. I. T. Luncheon, W. I. McNeill, who is still with Colgate-Palmolive-Peet, and is still in charge of all their cost accounting. There was also Wenzell from Pittsburgh, where he manages some of the major activities of the American Sheet and Tin Plate Company, certainly those that have to do with Research and Technical Development. Walt Whitman, from Whiting, and John Parsons of the Hammermill Paper Company at Erie, were also present, as was Duncan MacRae of the Chemical Warfare Service, U. S. A., located at Edgewood Arsenal. Based on the appearance of the majority of this group, the claim was made that most 1917 men were inadequately provided with decoration and protection on their top surfaces but Mr. J. F. Maguire, of Congoleum-Nairn, insisted strenuously that the rule was not universal.

1917 Continued

Captain F. S. Conaty writes from the Headquarters of the 382nd Field Artillery, U. S. A., that he is still in the Army on Civilian Duty with the Organized Reserves in Arizona. He expected to be out of forestry duty last summer but missed. He also writes that, being located in the wilds of Arizona, it is necessary for him to be especially observant of The Review and other publications in a search for facts about the Class of 1917. As a result, he was the only member of the Class to win the prize for identifying the engineer whose portrait appeared in Collier's for August 26, in an advertisement for the new Plymouth Six. The picture is that of Rad Stevens of miscellaneous fame. In bold letters over his photograph is the statement "I looked at all three with an X-Ray eye." For details we must refer you to Collier's. It is, of course, good to know that Rad is living up to his reputation and keeping in the limelight.

John Babbitt has sent us several clippings about the appointment of Leslie Hoffman as Engineer to the Public Works Administration of the NRA, where he will be responsible for projects inaugurated in Connecticut and Rhode Island. The Bridgeport *Post* has the following to say about the appointment: "The appointment of Leslie Hoffman, resident of Long Hill and dean of the Bridgeport Engineering Institute, as the Government's consulting engineer in charge of engineering projects initiated under the Public Works Act in Connecticut and Rhode Island, is an excellent move. It is an assurance that those in charge of this highly important aspect of the National Recovery Act are intent upon making expenditures count, in the shape of worthwhile public projects that will be of permanent value, and not merely "pork barrel" expenditures. Mr. Hoffman was appointed by Secretary Ickes on the recommendation of Archibald McNeil, Jr., chairman of the Government's board for Connecticut. The Government's new engineer was chosen solely on his capabilities, as he has never been active in politics. His personal record in Bridgeport brought him the endorsement of dozens of the leading men in the community, regardless of politics, and Secretary Ickes needed little argument when he saw the record."

In conducting a more intensive search following this indication that members of the Class were active in the NRA, I find that I. B. Crosby is on the consulting staff with a prospect of rather frequent visits to Washington to review matters involving geological facts and policies. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

There are fleeting moments when whole chains of related events tumble off the shelves of one's memory to parade in sprightly succession through one's musing. Such a cycle was touched off the other day when news came of the birth of a second child and first daughter, Judith, on August 28, to Donald and Jane Merrill. Remember the boy from Taunton who was such a wiz in descriptive geometry way, way up in the tippity-top floor of Rogers? From there he jumped to the Watervleit Arsenal making 16-inch guns for Uncle Sam.

Flick-flack-flick, the scene changes again. This time it is a beautiful summer day in 1921. Down the Taunton River go two old college chums in a canoe. A big-mouthed church bell calls, "Come back, come back" with slow religious rhythm, but the boys paddle on toward the perfection of a camp fire in the sylvan gloaming and the blending of trout and the exact amount of pine needles which make a perfect condiment.

Years go with the nimbleness of thought, a minister is asking, "Wilt thou take this woman to thy wedded wife?" One boy says, "I will." The other produces a ring, and the ceremony goes on. Again the two young men are together; this time on a piazza in East Walpole. "Descript" is revolved into the horizontal plane, fighting for his health atop a bed on the front piazza. But the old gleam is still in his eye as he takes occasional pot shots with an air rifle at the neighborhood Tom cats whose realization of the irrepressible springtime and the Tabby asleep at the foot of the bed overcomes their natural wariness. Then came David, and now, it's not David and Jonathan, but David and Judith. It's a great life, Judith, and so's your old man.

Bill Wills manages to make the Boston papers every so and so often, his latest recognition resulting from a ten-room, brick-end Georgian residence erected in Wellesley Hills. It's the sort of place one finds in "the land where the dead dreams go."

Harold Weber has gone to the Eidgenössiche Technische Hochschule, Zurich, Switzerland, for a year of travel and study. On the way over, his stomach, being male and unreasonable, was quite out of sympathy with the traffic disturbances up the line. (That, Harold, is to get even with you for the Palmer House *exposé*.)

Sumner Wiley called up on his way back from Maine where he absorbed as much sunshine and salt water as could be concentrated between the limits of six feet, two inches and 215 pounds. The remaining clams and mackerel now look upon him as the noble sarcophagus of their departed kinsmen.

Ray Miller got himself promoted to head of the Salem office of Moore and Summers, Insurance. He insists that he did not sell any policies to Fire Chief Costello, and that Mrs. Miller never cleans their hot-water boiler with KCN.

On the move are Arthur Windle, who left Hopewell, Va., for Cincinnati, Ohio; and Dr. Eugene R. Manning, who reversed the shuffle-off-to-Buffalo process by deserting that city in favor of the Textile Department at Clemson College, South Carolina. — F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1921

We apologize to Ray and the members of the Class concerned for the lateness of some of the notes this month. So little news is received that we carefully hide what meager material there is as a precaution against possible loss, and this was concealed so well that we didn't find it until a few days ago.

From John T. Schaeffer's column in the *Electric Refrigeration News* of May 10, 1933: "At the Frick Company, William Aubrey, Sales Manager, and Terry Mitchell, Advertising Manager, were my cordial hosts. Having taken the Frick student course shortly after his graduation from M. I. T. and worked in several of the Frick shops, Mr. Mitchell is familiar with most of the manufacturing operations and could answer all of the questions I could think to ask." Terry's address is in care of the Frick Company, Inc., Waynesboro, Pa.

Congratulations are in order as we record two new arrivals: Born to Mr. and Mrs. Raymond Anthony Snow, Raleigh, N. C., on March 14, 1933, a daughter, Martha Caroline. — Born to Dr. and Mrs. George Thomson, 21 Lothrop Avenue, Milton, Mass., on April 23, 1933, a daughter, Bonnie Jean.

We quote from a most welcome letter from Stuart Nixon, 3244 Pasadena Avenue, Detroit, Mich., with news not so welcome: "After months, or is it years, of silence, I respond to the stimulus of The Review and break forth into print. I have plenty of time now as I am on the shelf, I hope not for long, but nevertheless not part of the business world after some 11 years of grind. After five years of traveling it does seem good to be home again. The very idea of having a place that has more than one room, not looking over the menu and trying to figure out what will taste good, no train time-tables to watch, — gee, it is strange. But for all that I do long for the stuffy air of a sleeper and the sensation of being on the move again.

"Roughly figuring, I have traveled some 500,000 miles in trains, planes, boats, automobiles — everything excepting wagons, tractors, and horseback. I have seen most of the U. S. and Canada and part of Mexico. Last year I succeeded in going swimming in the Pacific, the Atlantic, and the Great Lakes all within a few months. As they say, a rolling stone gathers no moss even though it does get a good polish. So I am free and unattached even at this late date.

"I was in the East last summer and I now offer my apologies for not going to see you. Invariably I would be behind schedule and would have to hurry on. I guess the only member of the Class I saw was Dan Harvey. How is the weather back there? This district is terrible after sunny California. Jack Kendall says I am a better booster for that district than the native sons, which is a reflection on his efforts, as he certainly made it pleasant for me while I was there.

"I don't know yet what I will be doing soon, but if I have to push a broom in

1921 Continued

the streets, I will send you a picture that you can publish with the moral, 'Don't go into activities while at Technology.'"

From the Boston *American*, August 21, 1933: "Announcement was received here from Mexico City yesterday that Professor Manuel Sandoval Vallarta, physical instructor at M. I. T. and an authority on the cosmic ray, will marry Señorita Maria Louisa Margain on August 30." Heartiest congratulations, Val. Lest our readers be misled by the foregoing clipping, we hasten to add that Val continues as a member of the Department of Physics and has not suddenly become a disciple of Frank Kanaly!

Ray reports a visit from Maurice Mason, who is Factory Superintendent of the Multibestos Company of Walpole, Mass., where he has been since 1921. A boy nine years old and a girl of five are included in the family. The Masons make their home at 97 Union Street, East Walpole.

The January, 1933, issue of *Canadian Machinery and Manufacturing News* contains a report of a paper delivered by Dr. V. O. Homerberg before the Ontario Chapter of the A. S. S. T. Vic is Professor of Physical Metallurgy at the Institute and Technical Director of the Nitralloy Corporation.

November . . . Thanksgiving . . . may you have much for which to give thanks. A letter to your Secretaries will cause an offering of thanks at any season. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N. J.

1923

George Barnes, I, was appointed this summer to the head of the Civil Engineering Department at the Case School of Applied Science, Cleveland. Thanks to the publicity department of Case, we have a rehearsal of Barnes' activities since graduation. After serving for a year as assistant engineer of the sewerage division of the Massachusetts Metropolitan District Commission, the University of Florida secured his services in 1924. For six years he was a member of the Department of Civil Engineering as instructor, assistant, and then associate professor. He also engaged in private consulting engineering practice on many municipal and South American projects.

In 1929 he became designing engineer for Fuller and McClintock of New York City who had charge of the design of the Ward's Island Sewage Treatment Plant for the City of New York. After completion of this work he joined the staff of the Division of Engineering of the City of New York, where he was engaged in the Department of Sanitation. Barnes is married and will move to Cleveland this fall.

I have Doctor Rowe's usual appeal for assistance from the class for the Advisory Council on Athletics. Last year we scraped up $20 for him. How well we can do this year depends on how many of you can spare something to go for this thoroughly worthy cause. The line forms on the right.

And since your pens have been so laggard, that is all for this month. — HORATIO L. BOND, *Secretary*, 195 Elm Street, Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, 11 Broadway, New York, N. Y.

1924

I am glad to report that (Professor) Elmer Brugmann has been appointed Assistant Secretary of the class. I am pleased personally to have him in that capacity and I think he will be particularly helpful to us in keeping contact with the Alumni Association. His address is Room 2-131, M. I. T.

The first gun in our reunion is being fired. At this writing and if expectations come true, Charlie Phelps from Philadelphia, Bill Correale and Anatole Gruehr from New York, John Holden, Chick Kane, and Elmer Brugmann from Boston will all meet in Hartford with your Secretary on October 8 to lay plans and organize for our Tenth Reunion. The individuals named have been appointed as an organizing and steering committee by Bill Robinson. Unfortunately for us, Bill's contact with us this year will be by rather long distance.

Now at this point may I put in a suggestion! We are going to work to give you a reunion as memorable as the five-year reunion. Our efforts will be to give you what you want, but you will help by telling us what it is you want so that we won't have to do too much guessing. I'll tell you more later, but in the meantime, why not tell us something?

And a few personalities. George L. Lindsay, who has been spending the last year on a leave of absence at the Harvard Law School, has returned to his position with Pneumatic Tool Company at Franklin, Pa. — Announcement has been made of the engagement of Miss Mary D. Hatch of Lexington to Wilbert M. Gilman. Gilman is with Jackson and Moreland. The engagement has also been announced of Miss Margaret S. Button to Clarke Williams. Williams is an assistant professor in physics at the College of the City of New York.

On June 29, Miss Ellanora Gorham was married to Donald Creveling at Lake Charles, La. After November 1 they will be at Skouriotissa, Nicosia, Cyprus, where Don has been employed for a number of years by the Cyprus Mines Corporation. — On June 6 Miss Olive Whitman and John J. Parsons were married in Paris. Mrs. Parsons is the daughter of ex-Governor Whitman of New York. An interesting commentary is the fact that their grandfathers were classmates and roommates at Williams in 1854. Jack is with the International Telephone and Telegraph Company at Bucharest. — August 3 is the next date on the list, when Miss Dorothy Tobey of Kittery Point, Maine, and Abel F. Wood were married. And our last date is September 28, when Miss Gertrude P. Askew and Lyman S. Johnson were married in Atlanta, Ga. Stretch is with the Electrical Research Products Company in their Atlanta office.

During the summer I asked John Fitch to write a piece for another magazine in response to a request I had respecting Andrew Greaves who died last spring. I think I can well quote some of it here: "He was a Russian refugee and his personal account of his escape from Russia during the Revolution of 1921 would make an account fully as thrilling as 'The Way of the Lancer.' The bayonet wound reaching from the nape of his neck to his waist line was mute evidence of the horrors he went through. Eventually he reached Siam after presumably crossing Siberia and Mongolia. Here he was employed by a contractor before finally being able to reach America. After reaching New York he was taken care of by a family who arranged for his attendance at M. I. T. His determination to secure an education was not deterred by a new language or lack of funds. During the summer surveying camp at East Machias, he entertained on many a rainy night with selections on his three-cornered Russian balalaika and with Russian folk songs. He was a very likeable individual and very popular." To which I might add that when he died he was with the Metropolitan Life Insurance Company of New York in their Actuarial Department. — HAROLD G. DONOVAN, *General Secretary*, 372 West Preston Street, Hartford, Conn. ELMER BRUGMANN, *Assistant Secretary*, Room 2-131, M. I. T., Cambridge, Mass.

1925

The Secretaries have no news available for this issue of The Review but promise a full complement in the December number. — HENRY V. CUNNINGHAM, JR., *Secretary*, 43 Chestnut Street, Boston, Mass. HOLLIS F. WARE, *Assistant Secretary*, 16 Smith Avenue, Reading, Mass.

1926

With our chest properly distended, we last month recorded several professional achievements by some of the more gifted of our fellows. To the list must be added a new M.D. Dr. Edwin L. Lame, with Hippocratic dignity, pursues his chirurgeonly way about the corridors of the Germantown Hospital (Penna.). His presence at the next reunion as official leach is imperative.

And then there is John K. Sumner, who recently was included in a group to whom Institute graduate scholarships had been awarded; Isaac W. Gleason, whom the Geophysical Company has hired to practice some of the more occult forms of prospecting (he henceforth shall be known as Doodle-Bug); and A. F. Horle of American Smelting and Refining, who has simplified his address by moving from Chihuahua to Ocotlan, Oaxaca, Mexico. Some other members of the class whose scholastic kudos remain unreported are: Henry A. Ambrose (Ph.D.); Edward A. Fulton (S.M.); and Paul T. Jones (Ph.D.).

1926 Continued

And speaking of addresses, we must spoil a good jape by recording that Bill Rivers has improved his address by moving from 27 Jail Road, Lahore, Punjab, India, to Karachi, India.

In August was announced the engagement of Miss Anne L. Craig to James G. Walker, of 45 Prospect Place, Tudor City, N. Y. — On April 17, 1933, a daughter, Virginia, was born to Mr. and Mrs. V. Byron Bennett of Ipswich.

At the Five-Year Reunion Hizzoner President Dave Shepard suggested that the next reunion be held concurrently with the All-Technology Reunion in 1935, one year in advance of our normal tenth reunion date. Other members of the class have expressed approval. Since a decision must be made before many moons, reactions to the idea will be welcome. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

1928

Ralph Jope has reminded me several times that the vacation for class secretaries has come and gone and in spite of my arguments that no news was good news, good old Ralph hammered away on the old theme of the "Spirit of '28 must carry on." I replied that I was very busy, and then the Portland flash countered with the fast one, "Oh, of course, I realize you big shots are too occupied with big deals to bother with such small fry," so he added, "give me what facts you have and I'll write them up!" Naturally, the purpose of such a remark was to put me in sack cloth and ashes, put steam in the boiler, and overcome the last vestige of writer's cramp. Now the reason for including this little pen sketch is to inform youse guys and youse gals that your President is often the spark plug for this column and I believe credit should be given where it is due. What d'ya say? Let's give him a big hand! Thanks.

Did you know that Johnny Reynders was married? Yes sir, that quiet chap with the dead eye for shooting basketball shots stepped off in a blaze of glory on July 22 at the Park Congregational Church in Springfield. His bride was formerly Miss Ellen Louise Richert of Springfield. Gerry Brickett was the handsome best man and George De Camp and wife were present with Joe Parks and Ernie Knight. Congratulations, Johnny!

Myron Helme and Miss Elsie H. Lettan were married June 16 at Spotswood, N. J., and are now at home in Helmetta, N. J. Congratulations and best wishes to Helmie and Elsie!

We have a brief note regarding the sudden death of John W. Hepburn who was well known to VI-A men. John died on June 21 after a short illness of three days. We extend our sincere sympathy to his family.

Most '28 men will remember George (Porky) Flynn. George has been in China for three years with the Texas Oil Company. We also understand he married a California girl last fall. On June 17 the Associated Press carried a despatch from Mukden, Manchuria, as follows: "George A. Flynn, formerly of Hawes Street, Nashua, N. H., who is employed by the Texas Oil Company in Mukden, was seriously wounded when three Chinese bandits raided his home and stabbed him in the abdomen with a spear." No further news has been received about Porky, but we are crossing our fingers in the hope that it means good news!

Harry F. Cade, Jr., IV-A, has assumed the principalship of the Berkeley Preparatory School, Boston, commencing this fall. Harry succeeds the late Dr. Hopkinson, who established the school in 1907. Congratulations, Harry!

During our vacation this summer your Course II Secretary (here may I introduce Mr. Joe Parks, gentlemen?) and I made a round trip by Ford to my home in Minneapolis. The 3,000 miles was run off in jig time by ferrying the car across Lake Erie and Lake Michigan, going out, and across Lake Erie coming back. We drove out easily in three days, stopping at Niagara Falls (Joe is planning) and at Grand Haven, Mich., for some golf. Six days were spent in Minneapolis, then we made a ten-hour drive to Chicago (464 miles). That allowed three days for the Fair and three days to get to Boston. Altogether it was quite a trip. Have you seen Joe Parks play golf? — GEORGE I. CHATFIELD, *General Secretary*, 420 Memorial Drive, Cambridge, Mass.

1931

It is with deep regret that I inform you of the death of Bob Lamoretti, one of our most popular classmates. Bob was a victim of his great interest in sports, being hit by a pitched ball during a baseball game. The accident occurred on Saturday, September 2.

Several clippings have come across my desk while I was away during the summer. While in Europe I saw Elliot Whittaker, who, at that particular time, was bicycling through Germany. Elliot is in Europe on an art scholarship. I hear indirectly that Jim Fisk likes England but did not see him.

Mr. and Mrs. George Gamble Milne announced the marriage of their daughter, Celia Francis, to Otis Sibley. The wedding took place at Sky Meadows, Port Chester, N. Y., on June 9. — John Brandli was married to Miss Dorothy Ford Minard of Eastontown. The wedding was held at the Monmouth Country Club and the Brandlis will live in St. Louis. Mrs. Brandli is a graduate of House in the Pines and also attended the Wheelock School.

Mr. and Mrs. John Morris Tatterson of Portland, Maine, announced the engagement of their daughter, Miss Betty Morris Tatterson to Ken Smith. Miss Tatterson graduated from Wheelock in June. — John Gustafson was married to Miss Marian Gleason Makepeace of Braintree. The Gustafsons will live in Brooklyn at Flagg Court Apartments. Mrs. Gustafson is a graduate of Burdett Business College. Gus is affiliated with the Luckenback Steamship Company.

Otto Kohler was married to Miss Marian Ingraham of Auburndale, Mass. Mrs. Kohler is a graduate of Boston University, Class of 1932. The couple will live on the campus of Mt. Holyoke, where Otto is on the planning board. — Link Gifford is a proud father — a son born in August.

A note from Professor Locke reads as follows: "Donald L. Herbert is with the S. W. Shattuck Chemical Company in Denver and his address is 1266 Downing Street, Denver, Colo. He received his master's degree from the Colorado School of Mines in May, 1933, and then looked into various placer and lode mine operations in Colorado but did not find any that looked desirable for the investment of capital. The Shattuck Chemical Company treats molybdenum, vanadium, uranium, and radium ores. Don's present job is pretty nearly the bottom of the ladder, doing muscular metallurgy in the molybdenum section. He has been running an Evans roaster and claims to have turned out a nice sweet roasted product." — JOHN M. MACBRAYNE, JR., *General Secretary*, 55 Boylston Street, Watertown, Mass.

COURSE I

News from Course I is scarce around here, but I have gleaned two bits of news, each somewhat old by now. Late last spring the Greeley (Colo.) papers noted that "the engagement of Miss Elinor Alexander to Mr. William Moody was announced." Miss Alexander is studying at Colorado State Teachers College, and makes her home in Denver, which is apparently the reason Buck so vehemently cursed the distance from Boulder City to Denver in his last letter to The Review. Congratulations, Elinor and Buck.

A more recent letter from Sam Garre brings the news that his marriage to Miss Barbara Trowbridge will take place the latter part of October, and that a very satisfactory apartment has been located in New Rochelle. Again, congratulations. Despite the NRA, Sam still works for the Mundet Cork Corporation, 450 Seventh Avenue, New York City.

As for myself, I am now working for the Texas Company at its refinery here in Lockport and reside at the address below. As usual, all communications from members of Course I, Class of 1931, will be gratefully received, and acknowledgments made. — NELSON B. HASKELL, *Secretary*, 527 East 11th Street, Lockport, Ill.

1932

COURSE I AND XI

Finally a number of my letters have been answered. Those who have not answered my cards I assume to be definitely unemployed. The official roll call reveals 15 Course I men present or accounted for. Variety seems to be the spice of life. Cecil Boling is with Jackson and Moreland in Boston. Minot Bridgham is employed in the actuarial department of the Metropolitan Life Insurance Company. Frank Carboine has been surveying farms in the vicinity of Boston, chief-of-party,

1932 Continued

mind you. Rolf Eliassen has received his M.S. and is now working for his doctor's degree at the Institute. Charlie Fenno is in Rhode Island with the New Haven Railroad. Mr. Robert Bryant, Firp Follandice, has already had a glamorous career, first with the Town of St. Johnsbury, Vt., on municipal engineering (probably ditch-digging), then with the Vermont State Highway Department, and now in the Green Mountain Forest as a transitman with the U. S. Forestry Service. There's a man for you!

Freeman is employed by Uncle Sam in Washington, D. C. Stan Johnson is another of our illustrious classmates. His first job was that of a handy man in a roaring speakeasy near Ossining. This lasted until the Federal Agents decided that the joint wasn't operating under the N.R.A. code and displaying the patriotic Blue Eagle. Then Stan landed a job as a runner and clerk with Weicker and Company, a Wall Street brokerage concern. This lasted until they rushed his head off during the April stock market boom, when things became too wild for him. He ups and quits and nonchalantly finds another job in the Assembly Department of the Fisher Body Corporation in Tarrytown, N. Y. Jobs seem plentiful to Stan. As yet he hasn't found the Fisher Body girl.

Our two army friends, Lieutenants Lane and Person, are in the field with the Engineer Corps. Last year both attended the Engineer School at Fort Humphreys, Va., and "completed the course without dishonor." Lane is with the Memphis Engineer District and Person is at Fort Logan, Colo. The Army must pay well because both are trying to manage wives. It's the uniform that gets 'em! Why weren't we all West Pointers?

Bob McGilvra has a real engineering job. He's computing quantities and overhaul for the U. S. Bureau of Public Roads in Glacier National Park, Mont. After receiving his master's degree he beat it back to the wild and woolly West. His toughest job is to distinguish the white girls from the Indian "reds," but luckily he met Bob McKenzie, XV. He's an old Montanan, so picked out some swell "whites" for McGilvra. Go West, young man!

Poor Chuck Thayer! We should never have let him go West. On August 19, 1933, the wedding bells were tolled as Miss G. Elizabeth Fracker of Wooster, Ohio, and Mr. Charles Muchmore Thayer of Winona Lake, Ind., marched up the aisle of the Bond Chapel at the University of Chicago, and were united in holy matrimony. Chuck is employed in the engineering department of Montgomery Ward and Company in Chicago.

Stuart Miller and his former partner, Henry Mitchell, are hale and hearty. Mr. Miller, after receiving his master's degree, went with the Property Management Corporation of Boston, learning how to take care of buildings. Mr. Mitchell is with the bridge department of the Central Railroad of New Jersey. Leo Tyburski completes the roll call with the report that he has been teaching science and math at St. Thomas' College, Scranton, Pa. He's now looking for an engineering job. Anybody got any of those to spare?

How about a report from the rest of you? Remember that your Secretary is always hungry for news.

Chamras Chayabongse, XI, is planning to study at Harvard for his doctor's degree in sanitary engineering. Bob Thompson, XI, has been spending the summer with the State Bureau of Health as a sanitary inspector. — ROLF ELIASSEN, *Secretary*, 225 Orchard Street, Belmont, Mass.

COURSE XV

With the monthly rantings of our beloved Secretary still ringing in my ears, I must again, in the interests of the glorious name of Course XV, submit to my patient readers a no-account jumble of practically nothing. Bear with me apace and I may be able to hash out a bit of interesting recital.

Sears Roebuck has seen fit to transfer me to the East, and for the past month I have been in Harrisburg (the capital of Pennsylvania, for you birds who have conveniently forgotten fourth-grade geography). I am more or less marking time here until around the first of November, at which time I go over to Lancaster. We are opening a new store there and expect to do great things by the Pennsylvania Dutch who inhabit that splendid locale. You know, the country where, when his doorbell refused to function, old Otto posted this notice: "Button don't bell; please bump."

Ran into Ben Archambault a couple of times at the Fair in Chicago. He has been managing the M. I. T. Booth there, you know, since May, at which time he resigned from Chase, Harris, Forbes, just in time to avoid losing the job anyway when the company folded.

You might list this under Course I if you wish, but I received a note from Chuck Thayer the other day. He is with Montgomery Ward, a mail-order organization with a few retail stores here and there. (Seems like I've heard that name before!) Chuck has a position he calls "Merchandise Layout Draftsman, Retail Stores Department." Wow! Well, competitor or no, good luck, Chuck!

Outside of the above, my slate of tidings is clean. I warn you, my silent brethren, that unless you write me a few lines now and then, all my news will be about myself, which will make your reading much the less amusing, and my task of writing a tedious and dreary occupation. Gentlemen, give me the opportunity, and I shall put your names in print, with correct middle initial guaranteed! — May your Thanksgiving turkeys all be tender, and without further blessings or by-words, I'll sign off. — ADDISON S. ELLIS, *Secretary*, Sears Roebuck and Company, Harrisburg, Pa.

COURSE XVI

It is the same old word with me but this time I have a bit of information of a few, yes a very few, members of our illustrious class.

Dick Berry, XIII-C, stopped in for a brief visit as he was driving between Maine and New York. He brought tidings of his marriage on September 9 and also of the fact that he has recently taken up a new position in New York with the United Fruit Company. Dick is still living in Scarsdale.

Curt Cummings writes from Kenmore, N. Y., that he was able to convince Consolidated Aircraft in Buffalo of their need for his services as stress analyst. He has been working since August 1 and is all pepped up about the job. Lucky fellow! While passing through Philadelphia, Curt phoned Johnny Lyons, who is much occupied in the felt business.

Johnny Jewett wrote a nice long letter in which he related interesting experiences of Al Dunning, G. Frasier Casey, and himself during the past year. Since receiving their wings at Pensacola, the three of them have spent most of the time together at San Diego. Al is flying in the famous High Hat Squadron operating from the *Saratoga*. Johnny is also operating from the *Saratoga* in Squadron VF-6, which is famous in the Navy for holding the world's record (made last year) of the shortest interval between landings on the *Saratoga*. Frasier is flying in Squadron VF-5, or "Fighting Five," which operates from the *Lexington*.

Guzzie Guzewicz passed on a bit of interesting news about members of the class. He is looking for a good job, as far too many of us are doing at the present writing. In his travels he bumped into Leo Leino who spends most of the time at home in Westminster, Mass. Charlie Marvin, IX-C, is now applying all his high-powered math training to running an adding machine for a trade association in New York City. George Kerisher has turned wet and is selling beer dispensing fixtures in Boston. Sounds good to me! Reggie Lundstrom is working in a curtain factory near Boston. Just what his duties are I haven't ascertained. Harry Arnold is with a rubber concern in Connecticut. I wish I had the dope a bit more complete, but this is the best I can do for now.

Edward S. Allee, 2nd Lt. A. C. R., writes: "I am now stationed at Langley Field, Va. (5 Dodd Hall), in the 33d Pursuit Squadron, having graduated in July from the Air Corps Training Center (Randolph and Kelly Fields). The only other person whose fate I can recite with assurance is John F. Strickler. He also finished at the flying school in July, and is now stationed in a Pursuit Squadron at Selfridge."

Frank Cook writes: "After graduation I spent five quiet months listening to the radio, basking in Colorado sunshine, and saying with my fingers crossed that a degree from M. I. T. was a surefire entry into the nation's engineering offices. Finally did manage to get a supernumerary job with London Gold Mines (Alma, Colo.). Last February was lucky in getting an appointment down here as a Flying Cadet (Cadet Company A, Randolph Field, Texas). We don't make much money, but we have a lot of fun. Have completed half the course and hope I can stick." — JOHN LAWRENCE, *Secretary*, 17 Washington Street, Rutland, Vt.

1933

As I am writing this, it seems about time to be returning to Cambridge. For most of us, I guess, our turn is over and we are now history, as far as our doings at the Institute are concerned. A few of the boys are fortunate enough to be able to continue on. With all this NRA talk, I wonder if the old factory has signed a code for students. It surely would be a queer place on a 40-hour week.

From various sources, I have a few lines on some of the boys. — Tom Shaughnessy has become connected with the American Consolidated Tin Mines Corporation, where he will be chemist. Until the mill is started, Tom is selling stock in the enterprise. Bill Pleasants is working for du Pont Cellophane in Buffalo. Otto Putnam is employed by Endicott Johnson. Bob White is connected with a needle concern in Connecticut. Colonel Cashman is now spending his time with the Hood Rubber Company.

A line from Maine tells me that our former Class President and my former roommate, Bob MacKay, is studying law and is working in a local law office way up in the wilderness of Millinocket. — From the town of Wellesley, I said *town*, we hear that Bill Conant has secured the town scholarship to Babson Institute. Congratulations, Bill!

Word from Newton tells us that Miss Lucille Defren became Mrs. Franklin A. Park, Jr. on September 7. Congratulations and the best of luck to you!

If, in my capacity as Secretary, I can be of any service to anyone, I shall be glad to do so. I have a file of addresses and information which I am trying to keep up to date. I would like to receive any information you have and will be glad to reciprocate. — GEORGE HENNING, JR., *General Secretary*, 163 Barbey Street, Brooklyn, N. Y.

COURSE IV

And what of those pencil-pushing paint-slingers of Course IV. They all seem to have vanished into thin air after that "Thesis Orgy." Bits of news trickle back East from time to time. On last account, Joe Carbonell was still lingering in Boston, waiting for the Cuban government to change. Bunshaft and McConnell are probably full-fledged First Lieutenants by this time. Nothing from Don or Bill. And our "foreign correspondent," J. Mihnos, snubs everyone by refusing to write. Probably the stuff in the long-stemmed glasses has tied his tongue. Ah! Those Paris gutters.

Bobby Mills frets and fumes in Scotland Neck awaiting school again. Kelly flits in and out of Boston, stopping only to speak to "Our Janitor Mac." She will probably be the moving spirit in Sixth Year during the coming season. Gertrude is back again in Bangor. Our Hazel has surprised us and become engaged. The lucky chap is Luke Curtis, Course I, '32. Best wishes and all that.

Of the remainder of our select and imposing group, there comes no word, except that C. G. Martin, Jr., sits patiently under the Iowa apple trees and reads "Bromfield," while waiting for the world to slow down again. And he goes to bed at 9:00 p.m. (speak it softly).

Your favorite secretary is up to his neck in architecture with two winter residences designed and built by him since June. (Lucky Devil.) The sun shines, the world looks up, and life for the architects moves lazily on as before. — THOMAS K. FITZPATRICK, *Secretary*, 24 Maple Street, Salem, Mass.

COURSE IV-A

N.B. I don't think Lou expected me to print the following, addressed to me, but it was such interesting reading I thought the rest of you would be interested. — GEORGE HENNING, *General Secretary*.

Frank Heselton has been keeping the city of Reading, Mass., under control. Course IV-A seems to run to fishen — you know the old saying — so Frank has been doing some fishing himself up in New Hampshire and thereabouts. At that writing, Frank said that he was still a member of the unemployed army, although he had hopes of leaving said organization shortly.

I have been so busy since school let out that I haven't even had the opportunity to do some real honest to goodness leather pushing after a permanent job.

I had a camp job as Director of Aquatics and Life Saving and as a result had a right good summer. It was great sport making the kids take it in life saving and, as a result, I am bearing many a good claw scratch on my back. I feel that it was a summer well spent, as it was good experience working with the boys and in addition there was plenty of good, wholesome, outdoor exercise. At any rate, I received enough for my life insurance premium.

As an aftermath of camp I took a two weeks' trip up into northern Canada in the vicinity of Hudson Bay and, believe me, did we ever get fish. Not just fish, but fishes and fishes and fishes. We were about 650 miles due north of here and it took 17 straight hours of driving to reach our destination. The last 20 miles of the trip was over a so-called road that could boast of hardly anything more than two wagon ruts. You know it was the kind of a road that just dodges tree stumps and boulders very nicely. At any rate, we covered that last 20 miles in a little over two hours and were driving in first and second most of the way. At the conclusion of our wild ride, we reached a fire ranger's hut where we were able to obtain a canoe and continue via water. We went down the river and into a lake and finally made our camping site about ten miles away from our starting point. And so we lived the life of Riley for about eight days, eating, fishing, sleeping, and still more fishing and eating. There was an honest-to-goodness Indian family living on the lake and we struck up quite a friendship with them. Consequently, we had some bear steak and moose meat. Personally, they could have my share of the bear's haunches, though I suppose it really is quite palatable if one is used to it.

Well, old boy, that is, in short, the *résumé* of my activities for the summer. What will come next, fate only knows. At all events, I hope to get located here in Rochester as I have some pretty good contacts. At any rate, I shall be ready for anything — Yes, Sir, the old bass horn is all polished up. The city is starting construction on a new library here and perhaps there is a chance of horning in on that. That in short is the news for Course IV-A. Amen. — LOUIS H. FLANDERS, *Secretary*, 291 Rosedale Street, Rochester, N. Y.

COURSE VI AND VI-C

My short visit at Tech was greeted by much rain; almost three days past and still it rained in sheets. The entrance to Walker's kitchen was flooded fully 20 cm. deep; the track contained water up to its retaining boards' edges in many places; the cellar walls of the dorms were trickling and the floors oozing with water; ponds, miniature lakes, and swamps covered the entire campus.

Many interesting changes and additions have been made at dear old Tech. The old board walk between building eight and the dorms has been replaced by a cement walk. Another cement path has taken the place of the cinder and pebble walk between building two and the dorms; and a cement walk from the new Physics Building connects at about the middle of the walk from building eight. The designer of these walks seems to have a propensity for curves, but I suppose it's the art in cement construction.

There will be no more dodging of front fenders or brushing and wiping of bumpers with college trousers along these walks. A seeded lawn has replaced the mud and cinder ground. A one-way traffic lane surrounds this lawn — parking will be elsewhere.

The new furniture and decorations in the graduates' dorms will hold the envy and admiration of many interior decorators. Here we have studio couches, large cherry-finished desks, chairs, petite bookcases to match, curtains, rugs, new-type beds with mattresses, easy chairs, and steel lockers made to order in every suite. In addition, the grads have their own lounge room, workshop, and a kitchenette in the cellar.

Walcott, Bemis, and Goodale have been thoroughly painted throughout. The "rustic" spots on toilet partitions have been completely obliterated and made foolproof with pearl gray conducting nonoxidizing finish.

Naturally, I was glad to arrive at a time when tardy '33 electricals were winding up their college career with 6.04 finals and other exams.

Charlie Quick, who as you may know, due to ill health, was forced to postpone some of his work, apparently made one of the high scores in 6.04 this summer. As a reward for his bold efforts under such trying conditions, he has good

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prospects of a job with the Detroit Edison Company upon his return to that city. Charlie tells me that the long comprehensive problem given to us in 6.04 was identical with the one given this summer. To conclude, he did all but the power circles.

Herb Endly, Joe Wetherell, Leon Keoylos, and Bob Burton were a few apostles of Woodruff in 6.04 this summer. The course was tough, but good, they exclaimed.

Herb is leaving for New York City to permanently secure his job with the Postal Life Insurance Company which will be waiting for him upon his return from home and Betty Ann. We may promptly expect an actuary or treasurer in our class. On his way to New York, Herb expects to stop at Chicago and offer his approval on the World's Fair. Joe in the meantime will finish writing up his thesis. Joe has no immediate job on hand, but with his cheery disposition and experience he should have little trouble in obtaining one.

Leon will remain here for another term to complete his course if available moneys allow, after which he will return to Greece to disseminate his American electrical training in his home country. Leon is a good plugger and makes an excellent Greek.

A short talk with Bob Burton enlightened me as to the many difficulties he has encountered and the many sacrifices he has gone through the past year. Words are too poor to express his financial condition. Bob is also a graduate of Yale and has had a great deal of experience as radio operator on board ship. I am sure he will greatly appreciate any help his classmates can offer. What little knowledge and experience he has gained, what mind he has developed is now available for employment. Help him if you can.

With the constant determination of developing an "H" thesis, Messrs. Payne, Baker, and Ennis have solidified their friendship to the extent of touring, or rather bumming, the country for jobs, but I am told it's chiefly to satisfy their passion for travel and excitement. There could not be an abrupt parting of friendship after their thesis. More news about these three horsemen later, when they throttle down to business.

Larry Jacobson refuses to be quoted in printed words, so all he allows me to say is that he spent his entire summer in the communications lab and has no job that will laden his pocketbook or satisfy his landlord.

My dear thesis partner, Dick Faldetta, is apparently so exhausted from the work he has done on the thesis in the last couple of weeks of the term that he has not the strength or courage to even answer my card.

Of all jobs held by Course VI and VI-C men this summer, I believe the most interesting I have heard of was the one held by Don Fink. Don's able services went to the Geology Department of the Institute. Professor Slichter, Don, and a few others were electrical prospecting of the earth's crust. There were approximately 2,500 square miles of surface prospected, surrounding the headquarters of Clinton, Mass. A great deal of the work had to be done at night when telephone and power lines were available for their use. More details of this interesting experiment will appear in the *T. E. N.* Don will continue with this for another month, after which he will seek other work.

From Cranford, N. J., comes news from the boy prodigy, Dill Collins. The keynote there is fishing and boating in the famous boat. As a side line and hobby, photography is of keen interest to him. Dill has not definitely informed me as to what he expects to do this winter. I assume he will be seeking more "H's" at Tech or at Stevens Institute. Wherever you go, Dill, we expect you to keep our rating high.

Jim Merrill is combing industries in New York City for a job. Jim has started a good piece of work that will greatly help and inform the members of our course. He has started a Robin letter that will be passed on from one member to another. Please do your share in including a few words about yourself and send it on as instructed.

If any of our members have never experienced the thrill of expressing themselves through the medium of a printed word, they may have an opportunity by writing an article on the metric system for the quarterly magazine, *Measurement*. Its purpose is to secure the adoption of the metric system of weights and measures in this country. My job is assistant editor, and your contributions will be appreciated. — EDWARD S. GOODRIDGE, *Secretary*, 10 East 16th Street, New York, N. Y.

COURSE VI-A

News from the 27 course members is rather meager. About half of them spent the summer loafing, or at least not doing anything very exciting, and the rest spent the summer at the Institute. At least two members of the course, Dick Zimpel and Hugh Davis, have finished with VI-A for good and have jobs. Dick is a teacher of chemistry, mathematics, and physics at Owen D. Young's school in Van Hornesville, N. Y., while Hugh has a job in Chicago.

I was informed yesterday by Charlie Alba that he can claim the honor of being the first in the course of the Class of '33 to be married and have a baby. He was secretly married to Miss Beatrice Holland a little over a year ago. Congratulations, Charlie, and thanks for upholding the near-tradition that at least one of the members of the course will marry in each class before he graduates. Despite his marriage, he and K. A. H. Smith, and Webster remain well nigh inseparable — even after having been lab partners.

Ray Brown and Bill Soley have each spent about half the summer on their coöperative work with the Boston Elevated, and, if we can break down their combined reserve of reticence, we shall have some stories of high and hazardous adventure on the subway trains to relate in a future issue. Fred Feustel and Larry Brown spent most of the summer on coöperative work with the Boston Edison Company. Wonder if I can get a job if I change my name to Brown?

As most of you have learned already, Dick Fossett and Hank Rahmel have been selected as two of the three chairmen of the graduate dorms. Dick took the summer off as a vacation, while Ray spent part of it at the Institute, and some of the rest of it hanging around the Tech booth at the Century of Progress.

I received an interesting letter from Harris Thompson, telling how he and Rahmel had driven to Chicago in 31 hours, leaving Boston at 7 a.m. one day, and getting to Chicago the next day at 2 p.m. I wonder what was the big attraction? Tommy says that it took him 2,075 miles to get home to Minot, but he thinks that he can reduce that to 2,010 miles on the return trip. He has been working for the local power company in Minot while home, and has painted his car.

Max Millard and I are doing our best to get our master's degree in January, or whenever they give them out around that time, and I am writing my thesis with the help of the Cambridge Police Department — and don't take that the wrong way. — JOHN F. LONGLEY, *Secretary*, M. I. T. Dormitories, Cambridge, Mass.

COURSE VIII

Europe is doing pretty well by our graduates this winter, what with both Ivan Getting and Bob Tripp on the other side of the Atlantic. Ivan has been with Calibron Products, Inc., West Orange, N. J., all summer, as has your Secretary. We have been roommates at the Y. M. C. A. and a good time was had by both of us. Ivan will sail early in the morning of September 27 on the *Europa*. His address will be Merton College, Oxford, England.

Bob plans to leave early in October for the Leitz factory in Germany. Let's hope the Nazis won't try to keep him when he starts to come home. He is going to be a traveling salesman in this country, but first has to learn how optical instruments are put together. Along with John Elting and Charlie Schroeder '31 in John's boat, the *Half*, he covered all of Long Island Sound this summer. It was a pretty exciting time with storms and a smashup; they even participated in a rescue at sea!

Around the halls of the Institute this fall will be Clewell, Sterner, and Raymond, all going on for graduate work. Dayton has been taking it easy all summer out on Cape Cod, but he will be busy assisting Dr. Compton and Dr. Boyce as well as representing the Boston *Globe*. And then, of course, there will be classes. Johnny has been doing statistical work at the State House, while Alvah has been spending the summer at home.

John Hopkins writes that he has been working and studying since June and that he will go to Brown University in the fall. He has an assistantship and will

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do graduate work. Duntley left for Mount Wilson early in September after spending the summer in the East and Middle West.

Stan Walters reports having a position with the Tobe Deutschman Company, making electrolytic condensers. Stan says that he finds the work particularly interesting because he is in a very new department.

Both Chartock and Parsegian write of active summers spent at home. They are now keeping an ear to the ground to catch the rumble of a distant job. Good luck, fellows!

I got up to Boston a little while ago for three days. Not a soul was around the Physics Department. Everyone, so Mrs. Thomas said, was fishing or gardening or chasing cosmic rays. — WILBER B. HUSTON, *Secretary*, 79 Washington Street, East Orange, N. J.

COURSE IX

On his way to a Ph.D. is Harry Rosen, at present researching under Dr. Belding at Boston University's School of Medicine. Title: Respiration of Human Spermatozoa.

Expected sometime at Rush Medical School, Chicago, is Chain (Henry) Swirsky, now reported traveling in Europe. — Engaged in the family trade is George Adolph Stoll. — Still seeking are William Hanley, Morris Green, Millions of Others. — To work in a paper mill goes Robert (Bob) Ripin. — At work in a brass factory is Malvin Mayer. — MALVIN J. MAYER, *Secretary*, 64 Nonantum Street, Newton, Mass.

COURSE XVII

School has started and Jim and Sully and Tom and Crane and the rest of the bunch aren't back. Seems funny, doesn't it? . . . and O'Brien and Summers and the other noisy juniors have our old desks and Professor Tucker is lecturing and Voss is assigning those damnable shoring problems and we're all out in the cruel, cold world. What a change a few months can make!

Had a card from Jim. He's learning the real estate game . . . thought you had a diploma to prove you were educated, Jim. He's attending a night law school, too. Always figured we ought to squeeze in some more of Professor Schaefer's dope if we could get it.

Bob and Tom report that Colonel dropped from sight for a while, but he rebutted with news of a prospective paint job. Didn't know we had artistic talent in old XVII. Crane replied that he was working with Voss and making a CO_2 chamber. Promises to remember me in his will, too, and he may be working for love after October 1 if he continues.

Tom said his eyes were coming along nicely and that he had a wonderful time while he was out of work for two weeks with pay . . . sprained wrist. I know that kind; we have them on my job, too. Neil is still in New York City, but having slack times in his office. Seems that FDR didn't allocate this N.R.A. work to soldiers. He asks us to call him if we are ever in the Big City . . . Whitehall 4-3800, extension something or other — I hung the card on a nail right at that spot.

Ed Rowell is going in for brickwork. He didn't say whether he was using scientific mortar or not. Coop is still in Cambridge. Our stadium was finished for the first game on October 14 but I'm still here; winding things up a little. Expect to go back to the home town for a while now.

Miss Ashe didn't get her little tea room at Provincetown this summer, and she was justly indignant when I suggested she serve 3.2. She does, however, extend an invitation for us to drop around some evening and have some of her "mixed drink."

Somebody go over to the Institute and ask around a bit for the faculty. We could stand a note about them pretty soon . . . and until next month. — BEAUMERT H. WHITTON, *Secretary*, Box 431, Charlotte, N. C.

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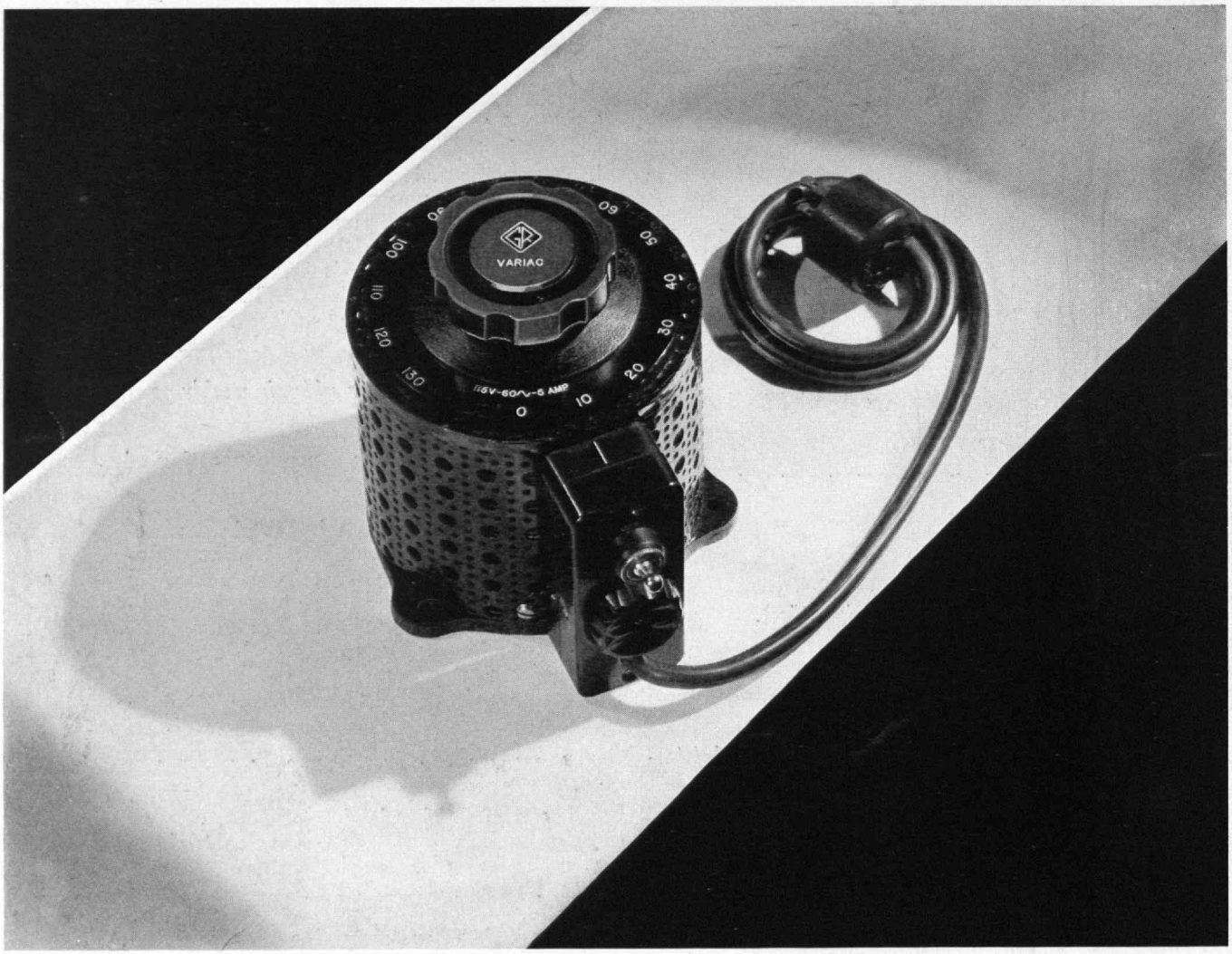
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